RENEWABLE ENERGY PROGRAM

CALIFORNIA ENERGY COMMISSION

Investing in RENEWABLE ELECTRICITY GENERATION in California

Report to the Governor and Legislature

COMMISSION REPORT

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Gray Davis, *Governor*

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This report was prepared by the California Energy Commission's Electricity and Natural Gas Committee pursuant to Senate Bill 1194 and Assembly Bill 995 and formally adopted by the Energy Commission on June 13, 2001. The views and recommendations contained herein are of the Energy Commission, and will become the policies of the State of California when accepted and acted upon by the Legislature.

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

Assembly Bill 995[1] and Senate Bill 1194,[2] enacted on September 30, 2000, create the Reliable Electric Service Investments Act (RESIA) [3] and extend the collection of a non-bypassable system benefit charge that was initially established under Assembly Bill 1890[4] (AB 1890) in September 1996 and distributed pursuant to Senate Bill 90[5] (SB 90) starting in January 1998. The RESIA requires the Energy Commission to create an investment plan for the Legislature's consideration that recommends an allocation of the funds collected over the first five years of the collection period, January 2002 through January 2007. This document was prepared in response to that requirement.

Legislative Requirements

The RESIA requires that from January, 2002 to January, 2012, $135 million per year is to be collected from the ratepayers of Southern California Edison, San Diego Gas and Electric Company, and Pacific Gas and Electric Company, and transferred to the Renewable Resource Trust Fund to support renewable power. The amount collected shall be adjusted annually at a rate equal to the lesser of annual growth in electricity commodity sales or inflation. Under RESIA, the Commission retains its oversight responsibilities for administering the Renewable Resource Trust Fund as established by SB 90.

The allocations established in the investment plan are to be based on three main objectives:

1) To ensure the vigorous pursuit of the most cost-effective and efficient investments in renewable resources, with the long-term goal of a fully competitive and self-sustaining renewable energy supply in California;

2) To increase, in the near-term, the quantity of California's electricity generated by in-state renewable energy resources, while protecting system reliability, fostering resource diversity, and obtaining the greatest environmental benefits for California residents; and

3) To identify and support emerging renewable energy technologies that have the greatest near-term commercial promise and that merit targeted assistance.

In addition, the RESIA requires that the Commission establish numerical targets reflecting the impact of the plan on (a) increased electrical generation produced from emerging technologies and from overall renewable resources and (b) increased supply of renewable generation from facilities other than those selling to investor-owned utilities (IOUs) under contracts entered into before 1996 under the federal Public Utilities Regulatory Policies Act of 1978 (PURPA).

[1] Stat. 2000, Ch. 1051.
[2] Stat. 2000, Ch. 1050.
[3] Article 15, Ch. 2.3, Part 1, Div. 1 of the Public Utilities Code, commencing with §399. Unless noted otherwise, subsequent citations herein are to the Public Utilities Code.
[4] Stat. 1996, Ch. 854.
[5] Stat. 1997, Ch. 905.

Investment Plan Development Process

The Commission's experience in developing recommendations for allocation of the Renewable Resource Trust Fund and administering it, as described in its 1997 *Policy Report on AB 1890 Renewables Funding*, has been an important foundation for this plan, even though market conditions today are different. Development and implementation of the Commission's Renewable Energy Program have required ongoing re-evaluation of market conditions and implementation strategies to ensure effective use of the Fund, and have in turn provided a strong base from which to craft a plan for the RESIA.

In developing this investment plan, the Commission also relied heavily upon input from industry stakeholders and other interested parties. The Electricity and Natural Gas Committee (Committee) held three workshops in which it asked the public to respond to questions about how to allocate funds and how the RESIA should interact with the SB 90 program, as well as various questions specific to various technologies and market sectors.

The Committee released a draft investment plan on December 22, 2000 and held a public hearing on January 16, 2001 to solicit public feedback on it, both written and verbal. In some cases, public comments revealed diverse and competing ideas on how best to use the funds, which the Committee carefully considered. In developing this final draft, the Committee also considered on-going developments in the market and experience with the Renewable Energy Program, and information provided by technical consultants to the Commission.

Although the investment plan was originally due to the Legislature on March 31, 2001, the Commission notified the Legislature of its intent to delay submittal of the plan until June, 2001 to more fully explore how the investment plan could best address the issues and uncertainties facing California's electricity system.

Funding Allocations

This investment plan recommends that the renewables funding flow through five Funds (expanding on the four Accounts established by SB 90 by explicitly dividing the Consumer-side Account into the Customer Credit and Consumer Education components.) The five Funds are as follows:

- *New Renewables Fund* – incentives for the production of energy generated from power plants that come on-line or are refurbished after September, 1996. The Commission recommends that this Fund receive the largest allocation, 50 percent.

- *Existing Renewables Fund* – incentives for the production of energy generated from power plants that were built before September, 1996. The Commission recommends a 20 percent allocation for existing renewables.

- *Emerging Renewables Fund* – incentives towards the capital cost of specific, renewable, distributed generation technologies. The Commission recommends that emerging technologies should be allocated 15 percent of the funding.

- *Customer Credit Fund* – incentives for consumers who purchase renewable energy through direct access contracts offered by registered renewable providers. The Commission recommends that10 percent of the funds be allocated for customer credits.
- *Consumer Education Fund* – support for consumer information, outreach, and marketing efforts. The Commission recommends a 5 percent allocation to education efforts.

Table ES-1 shows the proposed allocation per fund, and how the allocations differ from the Committee proposal dated December 22, 2000. As a result of market changes and in response to public comments, the Commission has scaled back the Committee proposal to allocate 25 percent of the funds to customer credits, and instead recommends a 10 percent allocation. The funding that was cut from customer credits is distributed equally to the New Renewables Fund, the Existing Renewables Fund, and the Emerging Renewables Fund. The allocations per Fund are constant over the four years of the program.

Table ES-1
Recommended Funding Allocations

	Cumulative Funding, Years 2002-2007 (millions)	Overall Funding Allocation	Change from 12-22-00 Proposal
New Renewables Fund	$337.50	50%	+ 5%
Existing Renewables Fund	$135.00	20%	+ 5%
Emerging Renewables Fund	$101.25	15%	+ 5%
Customer Credit Fund	$67.50	10%	– 15%
Consumer Education Fund	$33.75	5%	No Change

The Commission recommends that any funds that remain available at the close of year 2001 should be rolled over into the corresponding Fund created by this investment plan. In 1997, the Commission had recommended that if any funds remain available after the four-year transition period ending 2001, the first $16.2 million should be allocated to emerging technologies. Since the Legislature in 2001 added funding to support emerging technologies that are less than 10 kW in size through Assembly Bill 29X,[6] the Commission believes that only $6 million of this amount remains necessary, specifically targeted for installations greater than 10 kW.

For each of these Funds, the Energy Commission has developed recommendations regarding the eligibility criteria, the method for distributing funds, and potential changes that may need to be addressed in the future. The structure of each Fund builds upon the implementation strategies developed in response to SB 90, with changes noted below.

New Renewables Fund

The New Renewables Resources Account to date has substantially increased investment in new renewable power plants in California, and the Commission believes that the need and potential

[6] Stat. 2001, Ch. 8.

for additional growth merits recommending that 50 percent of the funding be allocated to this Fund. The RESIA emphasizes investing in new renewable resources in California and this priority was widely supported by stakeholders, both in written and verbal comments presented at public proceedings.

The Commission recommends that economic, energy system and environmental considerations merit specific changes in the eligibility criteria for the extension funding. For example, to the extent possible, funding should be tied to market prices to avoid over subsidization of projects. On-site generation that can be properly measured should qualify for funding, as should generation that is connected to the grid but isolated from local interconnection, and facilities located out of state that deliver their electricity solely to California. Payment of the competitive transition charge should no longer be a requirement for funding. Also, the Commission should have the flexibility to develop criteria that are relevant to specific auction solicitations, to best attract projects that would not have begun operation without the financial support.

Existing Renewables Fund

The Commission recommends continued support for existing renewable resources to help maintain the quantity and reliability of renewable electricity generated in California. The RESIA restricts support to technologies that are solid-fuel biomass, solar thermal, or wind, and which need financial incentives to be viable and provide benefits to the state.

Support for existing technologies has become increasingly important given California's electricity supply shortfall, and given that anticipated financial incentives beyond the Renewable Energy Program have not materialized. However, the Commission recommends that the allocation to existing technologies be reduced relative to SB 90 levels, because fewer technologies qualify for funding and in part because high electricity prices will reduce the amount of funding these facilities need.

Emerging Renewables Fund

The RESIA emphasis on emerging technologies and the current problems facing California's energy system merit allocating 15 percent of the funding to emerging technologies, an increase from the 10 percent allocation in SB 90. The Commission anticipates that at the close of year 2001, the SB 90 emerging funds will not be fully encumbered and will be rolled over to the Emerging Renewables Fund. The rollover will be available because there was low consumer demand on the funds in the early years of the program, but recent events have caused a dramatic increase in demand and an increase in allocation is necessary.

To further the goal of increasing the electrical generation from emerging technologies, the Commission recommends broadening the scope of technologies that are eligible for funding. Currently, only photovoltaics, small wind, solar thermal (electric) and fuel cells using renewable fuels are eligible for funding. The Commission recommends extending eligibility to other emerging renewable technologies that meet specified criteria. Also, the Commission recommends increasing the current size restriction for eligible wind systems from 10 kilowatts to 50 kilowatts. The Commission seeks discretion to lower the maximum size of wind turbine

considered eligible as needed to coordinate with other incentive programs, such as the California Public Utilities Commission distributed generation program.

Customer Credit Fund

The Commission recommends that 10 percent of the extension funds be allocated to customer credits. This is a decrease from the average allocation in SB 90 of 14 percent and from the 2001 allocation of 20 percent (the allocation in SB 90 ramped up over time). Despite the recent and dramatic decline in the direct access market, continued funding for customer credits is necessary to support those customers who are still purchasing renewable energy. The Commission also believes that the Customer Credit Fund can assist market development for new renewable powerplants that have had difficulty determining where to sell their power in today's uncertain electricity market. To this end, the Commission recommends limiting eligibility to electricity generated in the first five years an eligible renewable facility is on-line, effective year 2003. The customer credit provides near-term benefits in supporting the infrastructure needed for retail sales of new renewable electricity, and ultimately, the Commission believes that consumer demand is key to the long-term viability of renewable technologies.

The funding allocation is sufficient to support the currently limited market, but reinvigorated growth in the market could result in the Commission lowering the credit level and/or further limiting the eligibility for funding. RESIA already limits eligibility by excluding public entities from receiving the customer credit, but pending legislation could restore this eligibility. The Commission may consider additional changes designed to foster consumer awareness about the customer credit and maximize its efficiency.

Consumer Education Fund

The Commission recommends allocating 5 percent of the funds to consumer education. This is a five-fold increase from the 1 percent allocated in SB 90. The increase is necessary to respond to the concerns raised by an independent evaluation that found a need to dramatically increase consumer awareness about renewable energy. The Commission recommends that the eligibility criteria for funding be essentially the same as it was under SB 90.

Targets

The RESIA directs the Commission to develop targets reflecting the impact of the extension funds. Measuring success against established targets can be problematic, because of market variables that are outside the control of the Commission. These variables, such as the price for natural gas, can have a profound effect on the market success of renewable technologies. Because of this uncertainty, the Commission recommends evaluating progress towards meeting the targets no later than every two years, and adjusting the targets as necessary.

While recognizing the limitations of any targets, the Commission nonetheless proposes to establish targets that reflect the overall impact of the program and, more specifically, of the

Existing Renewables Fund, the New Renewables Fund, and the Emerging Renewables Fund.[7] The targets shown in Table ES-2 represent the goal for the percent of renewable electricity generated per year relative to the amount of electricity consumed per year in California.

Table ES-2
Targets Reflecting Plan Impact

	2002	2003	2004	2005	2006
Emerging Fund	-	-	-	-	1%
Existing Fund	12%	12%	12%	12%	12%
New Fund	1%	2%	3%	4%	5%
Overall	13%	14%	15%	16%	17%

In 2001, 12 percent of California's energy demand is expected to be met by renewables, and the overall target in year 2006 is to increase the renewable portion to 17 percent. Projects that come on line as a result of the New Renewables Fund will meet the largest share of this increase in renewable portion. Increases in the use of emerging technologies are an important but relatively negligible component of California's current generation mix; however, dramatic increases in their deployment could result in their representing one percent of California's energy mix by 2006. The portion of energy from existing technologies is expected to remain constant, as repowering, returns to service, and refurbishment and better maintenance compensate for the decline over time resulting from aging power plants. Assistance when market prices are low, as envisioned in the investment plan, is an important inducement for facilities that are currently mothballed to come back on-line, as well as for other facilities that would have gone off-line without assistance.

Need for Flexibility

The Commission must emphasize that this investment plan is being developed within a market setting that is highly volatile and dramatically different than the world of 1997 when the funding allocations for SB 90 were developed. The Commission and the renewables market has benefited from the flexibility that was built into the implementation of the 1997 report. In fact, in its May 2001 report on Energy Deregulation, the Board of State Auditors concluded that program flexibility is one of the main ways the Renewable Energy Program design maximizes the benefits of the program's funds. However, the considerable uncertainty in today's market merits even more flexibility in how the Commission distributes the extension funds.

The Commission recommends that program eligibility criteria and distribution methods continue to be developed through guidelines that can be periodically revised with public input to allow for rapid response to changes in the market, to make any needed mid-course corrections, and to avoid inefficiency. In the extension program, the Commission recommends expanding that allocation flexibility to allow the Commission to make decisions about reallocating no later than every two years, and report on those reallocation decisions as part of the biennial report required by SB 90, commencing with the 2002 report. This authority would be subject to a public process and be based upon the latest information on current and anticipated market conditions.

[7] The Customer Credit and the Consumer Education Funds contribute to each of these targets as well.

CHAPTER 1

INTRODUCTION

Assembly Bill 995 and Senate Bill 1194, enacted on September 30, 2000, create the Reliable Electric Service Investments Act (RESIA) and extend the collection of a non-bypassable system benefit charge that was initially established under Assembly Bill 1890 (AB 1890) in September 1996 and distributed pursuant to Senate Bill 90 (SB 90) starting in January 1998. The RESIA requires the Energy Commission to create an investment plan for the Legislature's consideration that recommends an allocation of the funds collected over the first five years of the collection period, January 2002 through January 2007. This document was prepared in response to that requirement.

The investment plan is divided into eight chapters. The first chapter provides a description of the legislative requirements for the investment plan and how the plan was developed, an overview of the renewable energy industry in the state, and an overview of the Commission's Renewable Energy Program (REP) established by AB 1890 and SB 90. Chapter 2 discusses the policy objectives guiding the overall allocation of funding, eligibility and exclusions for funding, numerical targets, and program administration. Chapters 3 through 8 address issues specific to the individual sectors of the industry (existing, new, emerging, fuel cells, etc.). Definitions of terms used in the investment plan follow Chapter 8.

Legislative Requirements

The RESIA requires that from January, 2002 to January, 2012, $135 million per year is to be collected from the ratepayers of Southern California Edison Company, San Diego Gas and Electric Company, and Pacific Gas and Electric Company, and transferred to the Renewable Resource Trust Fund to support renewable power. The amount collected shall be adjusted annually at a rate equal to the lesser of annual growth in electricity commodity sales or inflation. Under RESIA, the Commission retains its oversight responsibilities for administering the Renewable Resource Trust Fund as established by SB 90.

The allocations established in the investment plan are to be based on three main objectives:

1) To ensure the vigorous pursuit of the most cost-effective and efficient investments in renewable resources, with the long-term goal of a fully competitive and self-sustaining renewable energy supply in California;

2) To increase, in the near-term, the quantity of California's electricity generated by in-state renewable energy resources, while protecting system reliability, fostering resource diversity, and obtaining the greatest environmental benefits for California residents; and

3) To identify and support emerging renewable energy technologies that have the greatest near-term commercial promise and that merit targeted assistance.

In addition, the RESIA requires that the Commission establish numerical targets reflecting the impact of the plan on (a) increased electrical generation produced from emerging technologies and from overall renewable resources and (b) increased supply of renewable generation from facilities other than those selling to investor-owned utilities (IOUs) under contracts entered into before 1996 under the federal Public Utilities Regulatory Policies Act of 1978 (PURPA).

The RESIA requires the Commission to annually evaluate progress toward the objectives contained in the legislation, to assess the impact of the investment plan on reducing the cost of renewable energy generation to Californians, and to recommend funding allocations among the following eight categories:

- Production incentives for new renewable energy, including repowered or refurbished renewable energy.[8]

- Rebates, buydowns, or equivalent incentives for emerging renewable technologies.

- Customer credits for renewables not under contract with a utility.

- Customer education.

- Incentives for reducing fuel costs, that are confirmed to the satisfaction of the Commission, at solid fuel biomass energy facilities to provide demonstrable environmental and public benefits, including improved air quality.

- Solar thermal generating resources that enhance the environmental value or reliability of the electricity system and that require financial assistance to remain economically viable, as determined by the Commission.

- Existing wind-generating resources, if the Commission finds that the existing wind-generating resources are a cost-effective source of reliability and environmental benefits compared with other eligible sources, and if the Commission determines that existing wind-generating resources require financial assistance to remain economically viable.

- Specified fuel cell technologies, if the Commission makes all of the following findings:

    1) The specified technologies have similar or better air pollutant characteristics than renewable technologies in the investment plan.

    2) The specified technologies require financial assistance to become commercially viable by reference to wholesale generation prices.

[8] The RESIA restricts new allocations from being provided to renewable energy that is generated by a project that remains under a power purchase contract with an electrical corporation originally entered into before September 24, 1996 unless specific conditions are met (§399.6, subd. (c)(1)).

3) The specified technologies could contribute significantly to the infrastructure development or other innovation required to meet the long-term objective of a self-sustaining, competitive supply of renewable energy.

Investment Plan Development Process

The Commission solicited input from renewable industry stakeholders and other interested parties at three Electricity and Natural Gas Committee (Committee) workshops held October 30, 31, and November 2, 2000. Participants were asked to respond to a list of questions about allocation recommendations, interaction with the REP, and possible program design changes, along with other questions specific to various renewable industry sectors. After receiving comments at those workshops, the Committee released a draft investment plan on December 22, 2000. A Committee hearing was subsequently held January 16, 2001, to hear comments on the draft investment plan. This proposed final investment plan was developed after careful consideration of comments received both orally and in writing from workshop participants, input from staff technology experts, information provided by consultants with expertise in relevant areas, and lessons learned from the operation of the REP. Although the investment plan was originally due to the Legislature March 31, 2001, the Commission notified the Legislature of its intent to delay submittal of the plan until the end of June 2001, to give the Commission the ability to explore how the investment plan can best address the issues and uncertainties facing California's electricity system

The Renewable Energy Industry

Over the past two decades, California has developed one of the largest and most diverse renewable generation industries in the world. In the year 2000, California had over 7,000 megawatts (MW) of renewable energy capacity, including solid-fuel biomass, geothermal, wind, small hydroelectric (30 MW or less), solar thermal, photovoltaics, landfill gas, digester gas, and municipal solid waste facilities. These facilities produced an estimated 31, 978 gigawatt hours (GWh) in 2000, representing about 12 percent of the electricity used in California. Figures 1-1 and 1-2 show the technologies' relative capacity (MW) and generation (GWh) shares within the renewable power industry for 2000 .

Much of California's renewable development arose from the federal Public Utility Regulatory Policies Act of 1978 (PURPA), which required utilities to purchase power from non-utility generators, including renewable generators, at the utilities' full avoided cost. PURPA was implemented in California through the use of "standard offer" contracts between utilities and non-utility generators. There are four types of these contracts, with most non-utility renewables in California under the Interim Standard Offer 4[9] (ISO4) contracts. The ISO4 contracts, which covered a period of up to 30 years, provided fixed per kilowatt hour (kWh) energy payments for up to 10 years based on forecasted avoided costs, with payments converting to short-run avoided costs in year 11 of the contracts. The contracts also provided fixed capacity payments for up to 30 years. These guaranteed energy and capacity payments helped to attract financing for

[9] The Standard Offer Number 4 contracts were intended to be interim, pending final regulatory determination of standard terms. However, the ISO4 offers were suspended (no longer available for new contracts) in April 1985 (SO2 offers were suspended in March 1986), after a large amount of capacity was signed.

independent energy projects. As a result of the availability of these contracts, about 5,000 MW of renewable capacity were added to California's electricity system between 1985 and 1990.

Figure 1-1
California's In-State Renewable Capacity (2000)

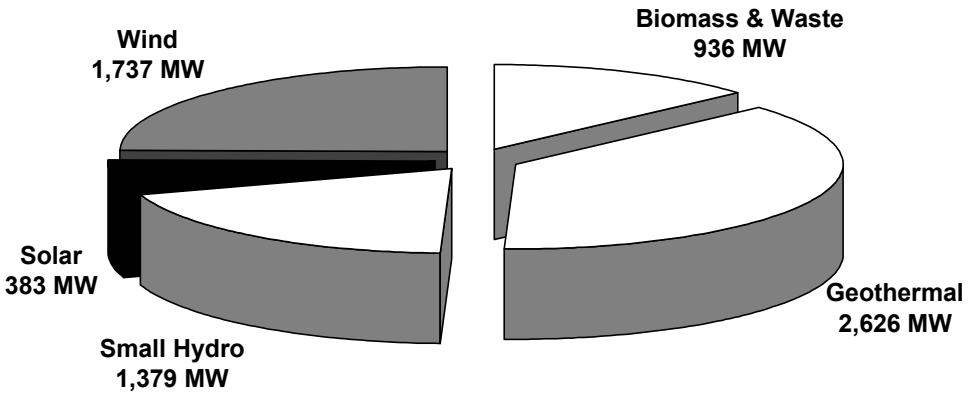
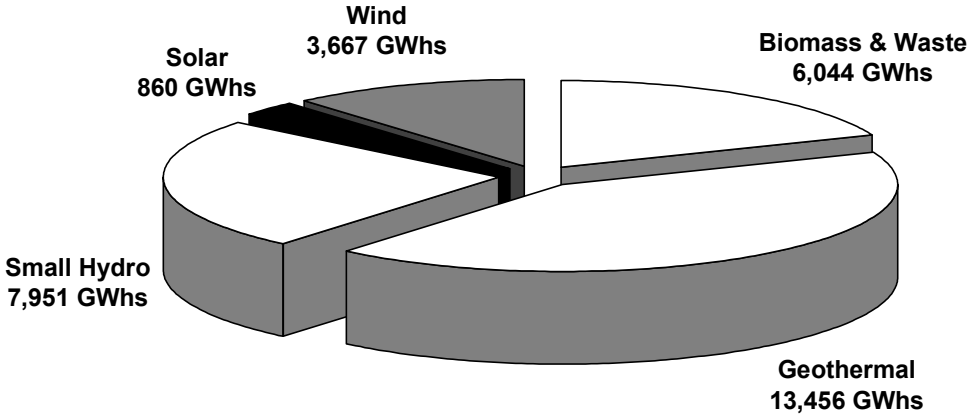


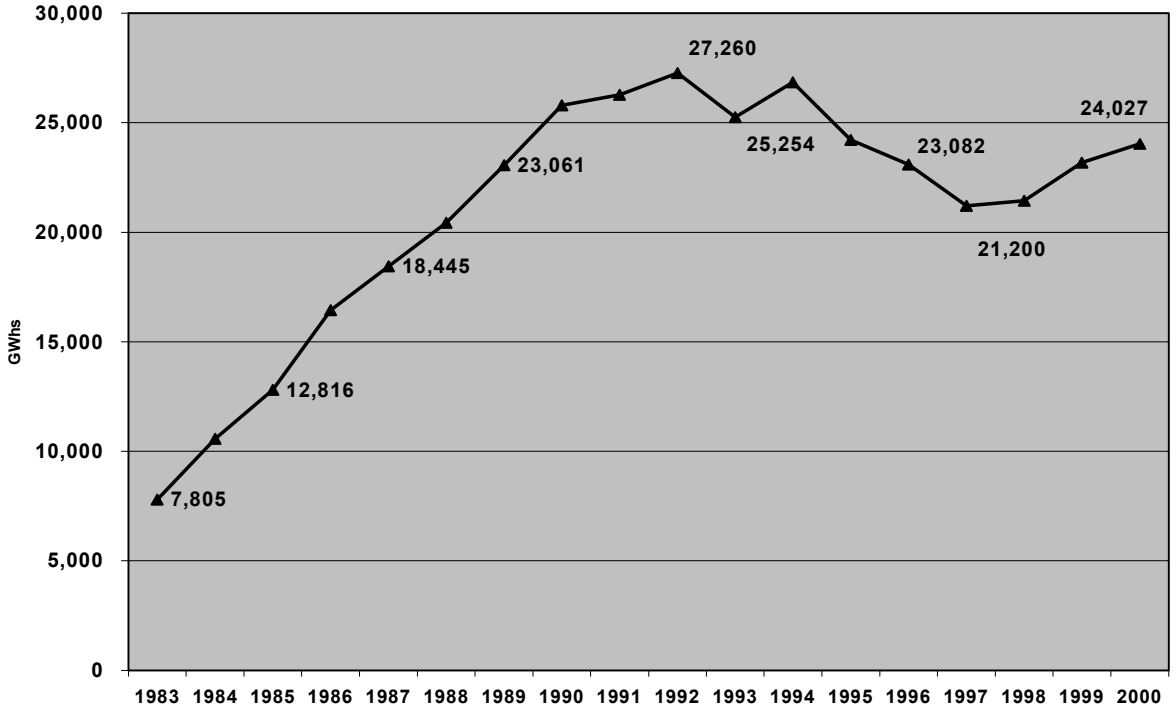
Figure 1-2
California's In-State Renewable Generation (2000)



In the last decade, renewable energy generation in California declined, due partly to low energy prices combined with the end of the high fixed-energy price period for many ISO4 contracts. When these contracts were originally signed, avoided costs were expected to increase over time. Instead, they decreased significantly in the late 1980s and continued to be low during the 1990s. This situation created what was known as the "price cliff" for facilities with ISO4 contracts, since at that time, short-run energy prices were as much as 85% lower than the energy prices these facilities received toward the end of the fixed price period. Figure 1-3 illustrates the statewide pattern of renewable energy generation over the period 1983-2000.

During the summer and fall of 2000, electricity prices in the Western region rose dramatically due to a variety of factors, including inadequate electricity supply, prolonged above-average temperatures, wholesale market failures, and significantly increased natural gas prices and environmental costs. Short-run avoided costs (SRAC) were also high and reached as much as 17.5 cents per kWh (weighted monthly average SRAC).

Figure 1-3
Non-Hydro Renewable Electricity Generation in California
(1983-2000, GWhs)



Source: California Energy Commission

With the high market prices for energy seen during this period, many renewable technologies could conceivably survive on their own with no further assistance. Most market observers suspect, however, that the high electricity prices are not sustainable in the long-term. A substantial amount of gas-fired generating capacity is currently "in the pipeline" and prices could fall in response to this increased supply. Regardless, the state is undertaking several efforts with the intent of lowering wholesale electricity prices. In addition, the competitive market is currently under intense regulatory and legislative scrutiny, and the resulting initiatives could also lead to lower prices. In either case, prudent renewable developers may regard the present high prices as a relatively short-term phenomenon. In such a highly uncertain atmosphere, developers and their financial backers might be reluctant to commit to renewable energy projects, which tend to be capital intensive. To provide some measure of market certainty while protecting against unnecessary payments, incentive programs should be linked to market prices. This design

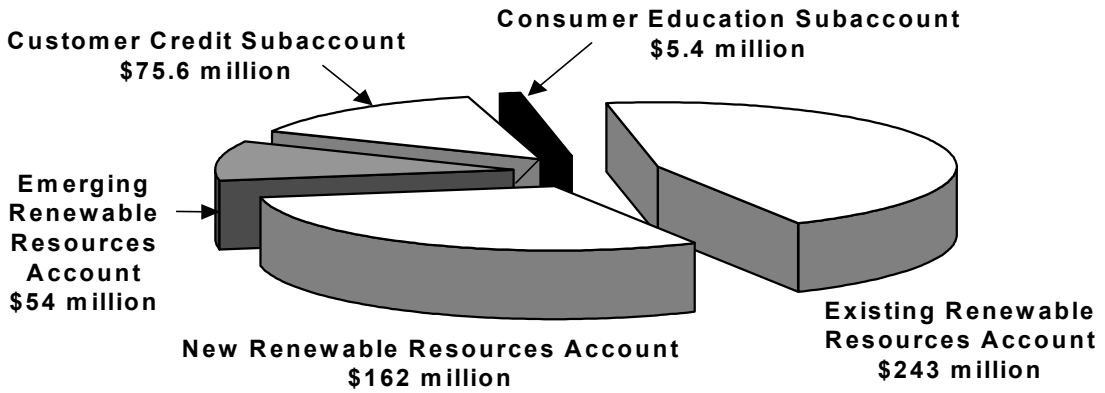
feature is a prominent component of the current REP and is recommended to be continued under the RESIA.

Overview of the Renewable Energy Program, 1998-2001

The REP was established pursuant to AB 1890 and SB 90 to provide support to reduce or reverse the declining trend in renewables generation in California. AB 1890 directed the collection of $540 million from IOU ratepayers through a system benefit charge collected over a four-year transition period starting in January 1998. These funds were intended to support existing, new, and emerging renewable electricity generation technologies. The Commission submitted a report to the Legislature in March 1997 with recommendations on how that funding should be allocated: 45 percent to existing technologies, 30 percent to new technologies, 10 percent to emerging technologies, and 15 percent to customer rebates and consumer education. The Legislature incorporated the allocation recommendations into SB 90, passed October 12, 1997, and directed the Commission to administer the program.

The REP began operation in January 1998. The program is divided into five "Accounts," shown in Figure 1-4. The following discussions provide a brief overview of these accounts as a point of reference for changes recommended in this investment plan. For a discussion of the results of these accounts, refer to the Commission's annual reports to the Legislature[10] and the independent evaluation report of the Renewable Energy Program.[11]

Figure 1-4
Renewable Energy Program Funding Allocation
1998-2001



[10] *Renewable Energy Program Annual Project Activity Report to the Legislature*, publication numbers 500-00-004 and 500-00-021.
[11] *Renewable Energy Program Preliminary Evaluation*, Regional Economic Research, Inc., October 30, 2000.

Existing Renewable Resources Account

Funds in the Existing Renewable Resources Account are distributed through a cents per kWh production incentive for qualifying renewable energy. The Account is divided into "tiers" intended to reflect the relative competitiveness of the various renewable technologies. As shown in Table 1-1, each tier was assigned a target price and cap. Payments to each tier are calculated each month by the lower of either the target price minus the market price for electricity, the available funds divided by the amount of generation submitted by all facilities in each tier that month, or the pre-determined cap for that tier. Monthly payments to each tier can be as low as zero but no higher than the specified cap.

Table 1-1
Existing Renewable Resources Account Target Prices and Caps by Tier
(¢/kWh)

		1998	1999	2000	2001
Tier 1 (Biomass, Solar Thermal, Waste Tire)	Target Price	5.0	4.5	4.0/5.0[12]	5.0[12]
	Cap	1.5	1.5	1.0	1.0
Tier 2 (Wind)	Target Price	3.5	3.5	3.5	3.5
	Cap	1.0	1.0	1.0	1.0
Tier 3 (Geothermal, Sm Hydro, Digester Gas, Muni. Solid Waste, Landfill Gas)	Target Price	3.0	3.0	3.0	3.0
	Cap	1.0	1.0	1.0	1.0

New Renewable Resources Account

For the New Renewable Resources Account, funds were allocated through two auctions in which project proponents submitted bids for production incentives along with their estimated generation for the first five years of program participation. Bids were accepted from lowest to highest until all funds were exhausted or all bidders were accepted. The Commission capped the individual bids at 1.5 cents per kWh pursuant to SB 90. Projects have a specified time to come on-line, after which they are paid the production incentive they bid for each month's qualifying generation. Payments are made for the first five years of generation only.

Emerging Renewable Resources Account

The Emerging Renewable Resources Account provides capital cost buydowns for the purchase of small renewable systems intended primarily to offset a customer's own load. Eligible technologies are photovoltaic, solar thermal electric, small wind (10 kilowatts or less), and fuel cells using a renewable fuel. The buydown funds were originally divided into five blocks as shown in Table 1-2, with successively lower incentives in each block. However, in March 2001,

[12] In an effort to increase generation from biomass facilities, the Commission raised the target price for Tier 1 technologies to 5.0 cents per kWh in October 2000.

the block structure was abandoned, and in May 2001, the rebate level was raised to $4.50 per watt in an effort to spur new installation pursuant to Assembly Bill 29X.[13]

Table 1-2
Emerging Buydown Program

Program Block	1	2	3	4	5	Total
Total funds per block (millions)	$10.5	$10.5	$10.5	$10.5	$12.0	$54.0
Maximum rebate per watt	$3.00	$2.50	$2.00	$1.50	$1.00	N/A
Maximum rebate (% system cost)	50%	40%	30%	25%	20%	N/A

Customer Credit Subaccount

In the Customer Credit Subaccount, customers can receive a rebate in cents per kWh for their purchases of qualifying renewable energy in the direct access market. The Commission sets a credit level (capped at 1.5 cents per kWh) for a six-month period. Table 1-3 shows the credit level since the program began in January 1998. The Commission has reduced the credit level twice, first in 1999 and again in 2000, because of the increased purchases and sales of renewable generation through the course of the program, which in turn placed greater demands for funds in the Subaccount. Rebates are paid on a monthly basis to providers of renewable energy after they pass the rebate on to the customers, showing the rebate on the customer's bill. Providers must register with the Commission to receive payment.

Table 1-3
Customer Credit Level

Time Period	Credit Level
January 1998 – November 1999	1.5 ¢/kWh
December 1999 – June 2000	1.25 ¢/kWh
July 1, 2000 – December 31, 2000	1.0 ¢/kWh
January 2001 - June 2001	1.0 ¢/kWh
July 2001 – December 2001	To be determined in spring 2001

Consumer Education Subaccount

The Consumer Education Subaccount provides funding to help raise consumer awareness of renewable electricity generation options and their benefits, increase purchases of renewable energy from the grid and purchases of small scale emerging systems, and establish a self-sustaining education effort that will continue beyond the four-year transition period to a competitive electricity market.

[13] Stat. 2001, Ch. 8.

Activities undertaken under the Consumer Education Subaccount include grass-roots and media outreach in targeted communities throughout California, market research, and development of consumer guides for prospective purchasers of renewable energy.

Timing of Funds

The allocation between accounts in the REP varied over time to most effectively further the goals of AB 1890. Funding to the Existing Renewable Resources Account ramped down because existing technologies were expected to become increasingly cost-effective during the four-year transition period and because the market price of energy was likely to increase over time. Funding for the New Renewable Resources Account ramped up because fewer new technology projects were expected to produce electricity in the early years of the program. The allocation to the Customer Credit Subaccount also rose over time because the customer-driven market was expected to begin slowly and build in the later years of the program.

CHAPTER 2

PROGRAM OVERVIEW

This chapter discusses the Energy Commission's recommended allocation of funds including the Commission's overall policy objectives, recommended eligibility and exclusions for funding support, and recommended numerical targets as required by the Reliable Electric Service Investments Act (RESIA).

Policy Objectives, 2002-2007

The development of the Commission's investment plan is guided by lessons learned during ongoing implementation of the Renewable Energy Program (REP), combined with the objectives established by the RESIA. Those objectives are as follows:

1) Increasing the quantity of California's electricity generated by in-state renewable energy resources,

2) Identifying and supporting emerging renewable energy technologies that have the greatest near-term commercial promise and that merit targeted assistance, and

3) Developing a fully competitive and self-sustaining renewable industry in California.

In pursuing these objectives, the Commission intends to ensure that both near- and long-term benefits are vigorously and cost-effectively pursued. By capping incentives at specified maximum levels, the Commission ensures that only the most cost-effective renewable generation participates in the program. Only the most cost-effective renewable investments, those that are able to participate at incentive levels of no higher than 1.5 cents per kWh for the New Renewables Fund, Existing Renewables Fund, and the Customer Credit Fund, are made under the proposed program. Similarly, only the most cost-effective emerging technologies investments will be made, while higher cost and/or unproven technologies are precluded from the Emerging Renewables Fund. In addition the ability to reallocate funds provides the means to redirect support from areas with little or no activity to areas where the initial allocation proves inadequate to fund all cost-effective renewable investments that could occur within the incentive cap.

With California's current electricity supply shortage, increasing the amount of renewable generation in California in the near-term will provide important benefits during the next few years. In the long-term, however, sustained increases in California's renewable generation will help alleviate future supply shortages and provide increasing environmental benefits to the State. In addition, emerging renewable resources with the greatest near-term commercial promise should lead to long-term industries that will be a significant component of California's electricity supply and contribute to significant reductions in the environmental costs of supplying California's electricity. In the end, sustainable, long-term market changes will develop a

competitive and self-sustaining renewable industry in California that will provide the most benefits to California, in both the near- and long-term.

The Commission believes that the direction in Assembly Bill 1890 (AB 1890) to develop and implement "market-based" policies to foster renewable investments remains relevant to this investment plan in order to maximize cost-effective public investment. The experience in implementing the REP to date indicates that the market-based policies in that program have been successful in inducing cost-effective investments in existing, new and emerging renewable technologies. The following three broad objectives contained in the Energy Commission's March 1997 *Policy Report on AB 1890 Renewables Funding*[14] remain important in maximizing the effectiveness of the funds provided by the RESIA:

1) To assist in developing a consumer-driven renewables market in California that facilitates consumers' choice of renewable power.

2) To encourage market-based development of new and emerging renewable resources.

3) To maintain the benefits and diversity of the renewables industry and move towards market competitiveness with the broader electricity industry.

While these goals remain relevant, the combination of the RESIA, current high electricity prices, energy shortages, and legislative and regulatory uncertainty in California's energy markets affects how the Commission pursues these goals. The market is at a crossroads, and the ability of consumers to choose renewable electricity may be challenged or enhanced by changes in market structure. Consumers' inclination to choose renewable products may be increased by the need for a hedge against electricity price volatility and uncertainty, or decreased in the face of uncertainty. Generators face similar concerns and issues: Will they continue to have a growing market outside long-term contracts? Will existing long-term contracts be altered in any way, or will new long-term contracts be required by policy makers?

Given these uncertainties, the allocations and investment methods recommended in this investment plan are structured to allow the plan to respond to changes in the market structure and price, so that the pursuit of the most cost-effective investments is ensured. In short, this investment plan is designed to build upon the successes of the REP, efficiently meet the objectives outlined in the RESIA, and remain as flexible as possible to ensure that the extended funds are used to support the most cost-effective and efficient investments in renewable resources.

Recommended Allocation of Funds

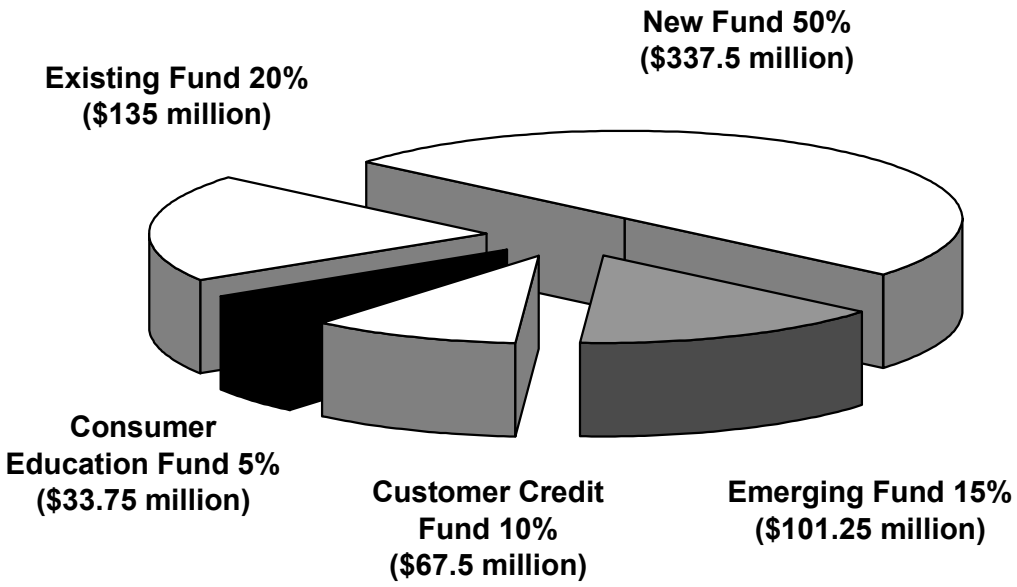
This investment plan recommends that the renewables funding flow through five Funds (expanding on the four Accounts established by Senate Bill 90 [SB 90] by explicitly dividing the Consumer-side Account into the Customer Credit and Consumer Education components.) The five Funds are as follows: the New Renewables Fund, the Existing Renewables Fund, the Emerging Renewables Fund, the Customer Credit Fund, and the Consumer Education Fund.

[14] Energy Commission publication number 500-97-002.

The five funds cover all of the eight allocation categories described in the RESIA. The allocation categories that address incentives to reduce fuel costs for solid fuel biomass facilities, solar thermal generating resources, and existing wind generating resources are covered by the proposed Existing Renewables Fund.[15] The allocation for specified fuel cell technologies is covered in Chapter 8. In each of these allocation categories, the Energy Commission makes determinations regarding the eligibility of the technologies, pursuant to the requirements in the RESIA.

Participants in the Commission's proceedings proposed widely varying allocations for the available funds. Some parties asserted that existing technologies should continue to be funded at the current levels in the REP, while others maintained that the main focus of the funding should be for new technologies. There was general agreement that the funding level for consumer education activities should be increased, and most of the emerging technology stakeholders stated that the allocation for emerging technologies should at least remain the same as in the current program. The Commission considered information presented by parties during the proceedings, information derived from administering the REP, and independent analyses of the renewable industry, in recommending the allocation among funds shown in Figure 2-1.

Figure 2-1
Recommended Allocation of Funds



[15] The RESIA uses the term "existing" only with respect to the category "existing wind generating resources" (§399.6, subd. (c)(8)). However, the Commission believes that the legislative intent for the solar thermal and biomass categories was to consider support for existing power plants using those technologies, pursuant to the conditions in the RESIA.

New Renewables Fund

The New Renewable Resources Account to date has been successful in substantially increasing investment in new renewable power plants in California, with over 1,000 MW of new renewable generating capacity currently participating. The Commission believes that significant additional investment is feasible and recommends allocating the greatest share, 50 percent, of the investment plan funds to this Fund. This emphasis on investing in new renewable resources in California is supported by the RESIA, which asks the Energy Commission to set targets for and track the success of increased supply of renewable generation available from facilities not under existing contracts with utilities. In public workshops and submitted written testimony, stakeholders generally agreed that support for new renewable generation should be the primary focus of this investment plan. Furthermore, in the initial auction under the REP, the $162 million allocated to that Account was completely encumbered by prospective projects; in the second REP auction, which was funded with $40 million in unused funds from the Existing Renewable Resources Account, the entire amount available was again encumbered, with several eligible projects not awarded incentives due to the limited amount of funds available. All of this evidence supports the substantial allocation to the New Renewables Fund.

Existing Renewables Fund

The Commission recommends that the Existing Renewable Resources Fund be allocated 20 percent of the funds. Generation from existing renewable power plants supports the objective of increasing, in the near-term, the quantity of California's electricity generated by in-state renewable energy resources. Should existing generation decrease, it would be more difficult to achieve the expected increases with new generation. Continuing assistance to existing renewable facilities is also justified because none of the cost-shifting measures envisioned during the development of SB 90 have occurred.[16] In addition, the reliability and environmental benefits provided by these technologies remain important to Californians, particularly as the State experiences electricity supply shortages.

At the same time, the allocation to existing technologies is reduced from SB 90 levels because the RESIA envisions fewer existing renewable technologies included in the Fund while establishing additional eligibility criteria (to be determined by the Energy Commission). The participating technologies have also made strides in improving cost-effectiveness since the SB 90 program was established. Furthermore, energy prices are expected to be higher during the five-year period covered by this investment plan, leading to a reduced need for support for existing generators.

Emerging Renewables Fund

A secondary objective of the RESIA is to "identify and support emerging renewable energy technologies that have the greatest near-term commercial promise and that merit targeted assistance."[17] The Commission believes that the emphasis on emerging technologies in the

[16] Other than the recent Assembly Bill 2825 (Stat. 2000, Ch. 739) incentives, which were structured to replace, not reduce, REP incentive payments for biomass facilities.
[17] §399.6, subd. (a)(2).

RESIA supports increasing the allocation for the Emerging Renewables Fund to 15 percent from the SB 90 level of 10 percent. A large portion of the funds originally allocated to the Emerging Renewable Resources Account by SB 90 have not been used at present. Therefore, as the REP is extended, funded by the RESIA, a substantial amount of SB 90 funds will likely remain unused in the Emerging Renewable Resources Account. The Commission recommends that these unused funds be rolled over as an initial allocation for the Emerging Program in the extended program. Despite this initial allocation and the rate at which Emerging Renewable Resources Account funds have been historically encumbered, the Commission believes the Emerging Renewables Fund will still need a higher allocation due to increased demand as result of the current energy situation in California. It is worth noting that the 1997 *Policy Report on AB 1890 Renewables Funding,* which was incorporated by reference in SB 90, recommended that the first $16.2 million of any rollover funds available at the end of the four-year transition period be used to augment emerging renewable technologies. Because of the recommended increased allocation and the anticipated rollover from the SB 90 funds, the Commission believes that only $6 million of this augmentation remains necessary, specifically targeted to systems greater than 10 kW in size.[18]

Customer Credit Fund

The Commission recommends that the Customer Credit Fund be allocated 10 percent of the extension funds. This allocation represents a decrease from the 2001 funding level in the SB 90 program and reflects the fact that the direct access market has dramatically declined in the wake of California's high electricity prices. The Commission believes, however, that it is important to maintain funding for those customers who continue to purchase renewable electricity and to be prepared for the possible renewed growth in the retail sale of renewable energy.

The Commission believes that the Customer Credit program remains a vital component of the long-term goal of a "fully competitive and self-sustaining" renewable energy industry in California. The Customer Credit program to date has assisted in building a market infrastructure that facilitates the sale of renewable energy outside utility contracts. This nascent infrastructure, however, remains challenged by the market structure in California and the current uncertainty about that long-term structure.

In the near-term, the Customer Credit program supports a developing market infrastructure and provides an incentive for the purchase of energy from renewable power that is both generated in-state and sold outside of a utility contract. It provides an incentive for electric service providers to develop contracts for the purchase of in-state renewable generation, to market renewable energy, and to capture consumers' interest in renewable energy. This promotes the goal of the RESIA to increase the supply of generation from in-state resources other than those selling to investor-owned utilities (IOUs) under contracts entered into before 1996. In the long-term, consumer awareness of and demand for renewable power, along with companies that can supply that power in the retail market, are necessary for the success of the renewable industry, regardless of the market structure that eventually prevails. As the market grows and available

[18] It should also be noted that Assembly Bill 29X (2001-2002, 1st Ex. session, Stat. 2001, Ch. 8) has provided an additional $30 million to the Emerging Renewable Resources Account, which further mitigates the need to augment this account. However, this augmentation is limited by law to systems up to 10 kW in size.

resources become committed to renewable providers, the customer credit can help entice developers to create new sources of renewable energy. Therefore, the program addresses both short-term and long-term objectives of the RESIA.

Consumer Education

Finally, five percent of the funds are reserved for the Consumer Education Fund to support consumer information, outreach, and marketing activities. Stakeholders generally agreed that the level of funding in the SB 90 program (one percent) was not adequate to substantially increase consumer awareness about renewable energy options. Evidence from the preliminary independent evaluation of the REP[19] indicates that there is a need to dramatically increase awareness of the benefits of renewable power and the options available to California consumers. The critical energy market events of the last six months reinforce the need to provide consumers with better information about their options for addressing high and volatile energy prices. At five percent, the funding is substantially less than comparable funding allotted for other public entity consumer awareness campaigns. However, the Commission feels that five percent is initially appropriate given the size and scope of the necessary activities within this fund.

Allocation of Rollover Funds from the REP

In addition to the above allocations of extension funds, the Commission recommends that the rollover from each SB 90 Account (or Subaccount) be allocated to the corresponding fund within the extended program. As stated earlier, the Commission does not believe that the first $16.2 million of any rollover funds (three percent of the $540 million) needs to be allocated to the Emerging Renewables Fund as recommended in the *Policy Report on AB 1890 Renewables Funding,* given the availability of unused Emerging Renewable Resources Account funds, the rate at which Account funds have been encumbered, the augmentation of account funds under Assembly Bill 29X, and the availability of extension funds under RESIA.

Need For Flexibility

The Commission re-emphasizes that the recommended allocation of funds is a direct result of a vastly different electricity market than the one in 1997, when the *Policy Report on AB 1890 Renewables Funding* was developed. There is greater uncertainty today about the market structure within which the investment plan must operate. Events of the summers of 2000 and 2001 clearly will lead to unforeseen changes in the market structure in California. Accordingly, since the expected changes could dramatically affect the cost-effectiveness and usefulness of the assistance provided through the five funds, the Commission recommends that the Energy Commission be given the flexibility to make appropriate adjustments in the investment plan allocations and structures. The Commission believes that such adjustments may even be required before the beginning of the extended program in 2002, in reaction to changes in market structure in 2001.

[19] *Renewable Energy Program Preliminary Evaluation*, Regional Economic Research, Inc., October 30, 2000.

This investment plan has the overall goal of achieving a sustainable supply of renewable energy, thereby providing Californians with increased system reliability, adequate resource diversity, improved environmental quality, and economic development. To achieve this goal, it is essential that the investment plan be flexible enough to respond to changes in the market. Most parties attending the workshops agreed that the approach used in the REP, the use of guidelines that can be periodically revised through a public process, is the most effective way to administer the funds. This approach has enabled the program staff to make mid-course corrections in the REP in response to unanticipated events in the marketplace. The ability to respond quickly to changes in the electricity market ensures that the program remains market-driven while reducing the likelihood of participants receiving more funds than needed when market prices rise unexpectedly, as they did during the summer of 2000.

One area where the Energy Commission's flexibility has been limited, however, is the ability to reallocate funds at regular intervals, in reaction to market conditions. SB 90 directed that reallocation of funds only occur at or near the end of the program, and only if the Energy Commission could reasonably determine that the money reallocated to a Fund would not be needed in that Fund by the end of the program. The events of the past year have shown how quickly the market can change. Given the current uncertainty, the rapidity of changes in market conditions, and the five-year term of the program, the program must be able to move funding from one area to another, as market conditions demand.[20]

As mentioned earlier, the Commission believes that the shortages, high prices, and consequent prospects of regulatory change in the electricity market require flexibility in reexamining program allocations. The current unprecedented prices for electricity in the State may lead to a rapid expansion in demand for the Emerging Renewables Fund. Legislative and/or regulatory decisions could challenge the existence of the market infrastructure that delivers the benefits of this fund to consumers. High natural gas prices, if they are sustained in the market for some period, would tend to limit payments from the Existing Renewables Fund and increase demand for funds from the New Renewables Fund. In the investment plan workshops, some stakeholders recommended that higher allocations to Existing and Emerging Renewables Funds be accompanied by automatic rollovers of unused funds to the New Renewables Fund on an annual basis. The Commission believes that this proposal, while appealing because it furthers the legislative goal of focusing funds on new renewable power plants, has the disadvantage of limiting, rather than enhancing, program flexibility. In the extension program, therefore, the Commission recommends that allocation flexibility be established as follows:

- The Energy Commission shall, through a public process, make decisions about reallocating funds based upon the latest information on current and anticipated market conditions no later than every two years, and will report on those reallocation decisions as part of the biennial report required by SB 90, commencing with the 2002 report.

[20] One example of the flexibility the Energy Commission recommends was considered allowable only near the end of the SB 90 REP. In November 2000, the Existing Renewable Resources Account had a large amount of rollover funding because of high market prices for energy during June – November 2000. After a worst-case analysis by the staff concluded that the Existing Renewable Resources Account would not use these funds by the end of 2001 (the end of the current program), the funds were made available for an expedited auction for new renewable resources. Rather than sitting idle, the funds were used to assist approximately 470 MW of new generation that can potentially come on-line by the end of 2001 or sooner, adding to California's electricity supply. However, such reallocation could not have occurred earlier in the program under the constraints of SB 90.

- Between reallocation decisions, money in each Fund shall remain in that Fund and roll over in subsequent years.

- The Energy Commission should have the authority, as in the SB 90 program, to transfer money among Funds (which would then be repaid) if required, given any approved changes in allocation.

Eligibility and Exclusions

The recommended eligibility and exclusions for funding support for each Fund are summarized in Table 2-1. These eligibility and exclusions are similar to those within the SB 90 program, with some changes as noted below. Changes in eligibility criteria will apply to the RESIA funds and to all unused SB 90 funds that are rolled over into the extension program. SB 90 funds that are encumbered through the SB 90 program, however, will continue to follow the SB 90 eligibility requirements until those funds are either disbursed or are made available for reallocation.

New Renewables Fund

Within the New Renewables Fund, the Commission recommends allowing on-site generation that can be properly measured and accounted for and generation from two types of projects that are located outside California: (1) projects interconnected to the grid within California and isolated from local interconnection in their areas; and (2) projects connected in the Western Systems Coordinating Council (WSCC) grid area with guaranteed contracts to sell their output to California loads. The Commission also recommends that competitive transition charge (CTC) considerations be disregarded when determining program eligibility. The Commission recognizes that in some cases, these changes will require legislative action to alter the requirements governing the REP.

On-site generation was previously disallowed from funding eligibility for the New Renewable Resources Account in SB 90. The Commission recommends allowing on-site generation because the reliability, environmental, and local economic benefits of renewable generation used at grid-connected sites are equivalent to the benefits of generation that is sold in the market. Generation used on-site can also help to provide local system reliability and defer costly transmission and distribution system upgrades, thereby reducing system costs. To be eligible, on-site systems must develop and provide independent metering and submit monthly invoices with assurances equivalent to energy sold to the grid.

The Commission recommends that "landlocked" out-of-state facilities be eligible for funding from the New Renewables Fund because it is clear that these facilities are similar, in nearly all respects, to facilities within California.[21] These facilities are likely to provide the same system, environmental, and even much of the local economic benefits that in-state renewable power plants bring to California. The Commission recommends that the restrictions on customers avoiding the CTC be dropped, because these exclusions are no longer necessary in a world where the four-year transition period (when most of the CTC was to be collected) is over.

[21] The term "landlocked" refers to out-of-state facilities that can only connect physically to the grid within California.

Table 2-1
Eligibility for Funding

Fund	Eligibility Criteria
New Renewable Resources Fund	Eligible electricity must be from projects that meet the following criteria: • Newly built, according to criteria established in each auction. • Either (a) wholly located in California, or (b) partially or wholly located outside of California, but interconnected to the grid in California, and with no possible other interconnection outside the State, or (c) projects connected in the WSCC grid area with guaranteed contracts to sell their output to California loads. • Meet the requirements established in the extension legislation regarding facilities that repower while keeping existing long-term contracts with an existing IOU as specified in each auction. • Not have an active award from a previous auction by a certain date established as an auction criterion for each auction.
Emerging Renewable Resources Fund	Eligible systems must meet the following criteria: • Photovoltaic, solar thermal, small wind (50 kW or less), or fuel cells using renewable fuel, and other technologies as identified by the Commission. • Located on the premises of the end-user and be primarily designed to offset the customer's own load. • Grid-connected (as defined herein) and receive IOU distribution service (customer-owned utility service if opt-in to fund).
Customer Credit Fund	Eligible electricity must meet the following criteria: • Be sold to eligible end-use customers (within distribution service territory of utility collecting the public goods surcharge) through a direct-access transaction. • Be sold through a renewable provider registered with the Energy Commission. • Not sold to a public entity. • Beginning in 2003, be from the first five years of generation from an in-state renewable facility
Consumer Education Fund	Eligible participants must meet the following criteria: • Either (a) non-profit agency with mission or expertise consistent with goals and purpose of the Renewable Energy Consumer Education Program; (b) individual or company with marketing, public relations, consumer education, or public interest marketing experience; or (c) public agency with experience or expertise in the above topics. • Comply with the criteria contained in Energy Commission solicitations announcing funding availability for this Fund.
Existing Renewable Resources Fund	Eligible electricity must meet the following criteria: • Be from facilities using solid-fuel biomass, solar thermal, or wind technology that are found by the Energy Commission to meet the criteria established in the extension legislation. • Be from facilities that either are (a) wholly located in California or (b) partially or wholly located outside of California, but interconnected to the grid in California, and with no possible other interconnection outside the State. • Not under a high fixed price contract, as defined by the Commission • Not be energy for use on-site. • Not receiving funding from the Emerging or New Renewables Funds. • Not actively participating in the Central Valley Agricultural Biomass-to-Energy Incentives Program.

The Commission recommends that additional eligibility criteria be established in specific proposed auction solicitations. For example, the on-line date after which a project in a particular auction is eligible must be determined once the auction date itself is established. Also, projects should be considered ineligible in an auction if, by a determined date, they hold an active award from a previous auction.

Emerging Renewables Fund

The Commission believes that the objectives of the RESIA and the experience of implementing the SB 90 program support several expansions of eligibility for the Emerging Renewables Fund. With a portion of the SB 90 funds in this Account unused at present, the Commission believes that these expansions are necessary to foster the goal of increased quantity of California electrical generation produced from emerging resources. Again, the Commission understands that some of these changes will require legislative action to alter the specifics of the law applying to the REP.

First, the Commission notes that the RESIA establishes an objective of identifying, as well as supporting, emerging renewable resource technologies. Therefore, the Commission recommends that other technologies be considered under the extension program, in addition to the four technologies established as emerging by SB 90 – photovoltaics, small wind, solar thermal (electric), and fuel cells that use a renewable fuel. To identify other prospective emerging technologies, the Commission recommends reviving the criteria and process for determining technology eligibility proposed in the *Policy Report on AB 1890 Renewables Funding*. The Commission will consider the need to update these criteria given the experience with the SB 90 program and the market conditions at that time. Possible technologies that could be identified with this process include microturbines that use a renewable fuel.

A second expansion of eligibility the Commission recommends is to change the definition of "small wind" to systems that are 50 kilowatts (kW) or less, rather than the present 10 kW or less, to capture the benefits of the latest technological advances in small wind turbines. The Commission seeks discretion to lower the maximum size of wind turbine considered eligible as needed to coordinate with other incentive programs, such as the California Public Utilities Commission self-generation program implemented pursuant to Assembly Bill 970.[22]

The Commission recommends that the overall definition of small versus medium and large systems also change, so that photovoltaic and other emerging systems less than 30 kW be considered small systems. This split in system size reflects the minimum size of 30 kW for renewable systems established by the California Public Utilities Commission in their new distributed generation program. The change will allow more small and medium-sized businesses to participate in the program and reduce the volatility and amount of their energy costs.

Customer Credit Fund

For the Customer Credit Fund, the Commission recommends several changes in eligibility. First, the RESIA explicitly prevents public entities from being considered eligible customers for the purposes of participating in the Customer Credit Fund. Second, while eligible customers must

[22] Stat. 2000, Ch. 329, as codified in Public Utilities Code Section 399.15(b).

still reside in the distribution service areas of IOUs contributing to the program, should a customer-owned utility opt to contribute an amount to the REP proportionate to the funds provided by the IOUs the Commission recommends that their customers be eligible for customer credits.

Additional eligibility constraints on the Customer Credit Fund are reasonable to specifically target the credit to provide the most cost-effective near-term benefits, while continuing to pursue the long-term goal of developing the infrastructure to support a fully competitive renewable industry. The Commission therefore recommends limiting eligibility for the Customer Credit Fund, starting in the year 2003, to only the first five years of generation from any in-state renewable facility. The intent here is to address the current market realities with the Customer Credit Account by fostering the marketability of new renewable generation.

To ensure the realization of consumer information and education benefits from the Customer Credit assistance, the Commission may consider requiring entities dispersing the credit to send educational materials about renewable energy to their customers (either those developed by the Commission, by the entity, or both), or requiring that such entities provide their customer lists to the Commission so that the Commission can itself send materials to these customers. Eligibility may be further restricted if demand for funds exceeds availability.

Existing Renewables Fund

The Commission believes that the RESIA restricts support for existing technologies to existing solid-fuel biomass, solar thermal, and wind resources.[23] "Existing" here has the same meaning as in the SB 90 program – facilities built and generating power for sale before September 26, 1996.[24]

The RESIA also requires the Energy Commission to determine whether solid-fuel biomass, solar thermal, and wind resources should be eligible for the RESIA funds. For solar thermal to be eligible, the Energy Commission must determine that existing solar thermal resources enhance the environmental value and reliability of the electricity system and require financial assistance to remain viable. For wind to be eligible, the Energy Commission must determine that existing wind facilities are a cost-effective source of reliability and environmental benefits compared with other eligible sources, and that they need financial assistance to remain economically viable. Finally, for solid-fuel biomass to be eligible, the Energy Commission must determine that solid-fuel biomass facilities provide demonstrable environmental benefits in the form of air quality improvement.

Solar thermal facilities provide benefits such as operating at near full capacity during times of highest demand for electrical power, providing substantial system reliability while producing low amounts of pollution. In the 1997 *Policy Report on AB 1890 Renewables Funding*, the Commission determined that solar thermal facilities required assistance at a level similar to that

[23] The RESIA uses the term "existing" only with respect to the category "existing wind generating resources" (§399.6, subd (c)(8)). However, the Commission believes that the legislative intent for the solar thermal and biomass categories was to consider support for existing power plants using those technologies, pursuant to the conditions established by the RESIA.

[24] The Commission recognizes that at some point in the 10-year duration of RESIA, the definition of existing may require modification to avoid unequal treatment of facilities.

of biomass facilities. The Commission has not observed any changes in the financial viability of solar thermal facilities that would indicate any change in the level of financial assistance needed, and therefore recommends allocating funds to solar thermal facilities.

Although wind facilities are an intermittent resource and do not provide as much generation per megawatt of installed capacity as do other technologies, the large amount of installed wind capacity definitely contributes to system reliability. At the same time, wind generation produces few or no pollutants and can actually displace the need for generation from higher-polluting fossil facilities. Wind facilities typically require a lower amount of income on a per kilowatt-hour basis than biomass or solar thermal facilities, illustrated by comparing the average incentive payments made to wind facilities in the REP relative to payments made to biomass and solar thermal facilities. Therefore, the Commission believes that wind-generating resources provide a cost-effective source of reliability and environmental benefits when compared with other sources, and recommends the allocation of funds to wind facilities.

Biomass facilities burn agricultural and urban wastes that would otherwise be open-field burned or placed in landfills. The pollutants emitted from converting biomass wastes to electricity are lower than the alternatives because of the pollution control systems that are required on these generating facilities. Also, using forest wastes to generate electricity helps reduce the potential for forest fires. Although forest fires are unpredictable phenomena, they typically destroy large areas of forest and emit large quantities of harmful pollutants into the atmosphere. The Commission has therefore determined that biomass facilities provide environmental benefits, and recommends that biomass facilities receive production-based incentives in a similar fashion to the incentives paid through SB90.

Consumer Education Fund

The Commission recommends that eligibility for participation in the Consumer Education Fund remain substantially the same as established for the SB 90 program.

Numerical Targets

This investment plan is expected to contain numerical targets, or projections, reflecting the impact of the investment plan on the increased quantity of California electrical generation produced from overall renewable resources and from two subcategories established by the RESIA. The first subcategory is California generation from emerging technologies, and the second subcategory is increased supply from facilities other than those selling to IOUs under contracts entered into before 1996 and pursuant to the Public Utilities Regulatory Policies Act (the "standard offer" and similar negotiated contracts). These subcategories correspond to the current Emerging and New Renewable Resources Accounts in the REP.[25]

[25] Some generation in the New Renewable Resources Account is from facilities that were in existence prior to September 1996, and are repowering or enhancing their facilities with separable new equipment. Some facilities in the Existing Renewable Resources Account are also no longer associated with their previous utility contracts. Some generation from emerging technologies, such as photovoltaic systems, could participate in the New Renewables Fund, rather than the Emerging Renewables Fund, if installed at a site that does not have the customer load required for participation in the Emerging Renewables Fund.

The Commission proposes to establish targets reflecting the impact of the overall program, of the Existing Renewables Fund, of the New Renewables Fund, and of the Emerging Renewables Fund. In addition, the Commission continues to believe that the green market supported by the Customer Credit Fund can, in the long run, contribute to the proposed overall program target. The RESIA requires the Energy Commission to evaluate progress annually toward meeting the established targets and assess the impact on reducing the cost to Californians of renewable energy generation.

One difficulty in establishing these targets arises from the variety of market variables, in addition to the incentives recommended in the investment plan, affecting the development and continuing operation of renewable power plants. Technological changes, conventional generation prices, market structure, general economic growth, consumer attitudes, and ingrained standard business practices are variables outside the immediate influence of the program. For example, if natural gas prices remain high and are reasonably projected to remain high for some time, existing, emerging, and new renewable generation will tend to fare better in the market. The incentives in the investment plan can help these resources take advantage of the favorable market conditions, but it may be difficult to separate the effect of the conditions from the influence of the program. However, if natural gas prices drop back to historic levels, the renewable industry may face challenges in developing and maintaining generation under such adverse conditions. In that case, the program incentives could be ineffective, and targets consequently difficult to achieve.

It is challenging to design targets that reflect this uncertainty. Targets designed assuming adverse market conditions may seem low if beneficial market conditions prevail, and an objective evaluator would not necessarily determine that the program was a success. On the other hand, targets designed assuming beneficial market conditions may seem too aggressive if market conditions are adverse, and an objective evaluator would likely determine that failure to meet these aggressive targets should not be taken to indicate program failure.

The Commission recommends adopting targets for renewable generation in California that represent a percentage of the total generation for consumption in California. Starting from a baseline number in 2002 of 12 percent of such generation from renewable sources, the Commission recommends that the target percentage be an annual increase of one percentage point per year, reaching 17 percent of generation for use in California by 2006. Table 2-2 shows the targets recommended by the Commission.

Table 2-2
Recommended Numerical Targets

	2002	2003	2004	2005	2006
Emerging Fund	-	-	-	-	1%
Existing Fund	12%	12%	12%	12%	12%
New Fund	1%	2%	3%	4%	5%
Overall	13%	14%	15%	16%	17%

The Existing Renewables Fund percentage remains constant over time to reflect the expectation that repowering, returns to service, refurbishment, and better maintenance will compensate for

the eventual decline in generation as these facilities age, and the expected growth in electricity consumption in California over time. Currently, some additional generation from these facilities is expected as mothballed facilities return to service and older facilities are repowered with newer, more efficient generating equipment.

The New Renewables Fund percentage, on the other hand, increases over time as new facilities come on-line. Since the Commission does not expect that new facilities will come on-line regularly enough to meet the targeted increase of 1 percent each year, the annual targets for this account should be taken as reflecting a trend, rather than a specific amount in each year.

The Emerging Renewables Fund percentage of generation is small; however, the amount of generation from these emerging technologies is rapidly increasing. Given the current market interest in these systems, increasing generation from systems supported by the Emerging Renewables Fund to 1 percent of California consumption by 2006 is an aggressive but feasible target. The Commission will track progress and adjust these targets in the biennial reports, so that ongoing market conditions can be reflected and program performance can be accurately judged.

Program Administration

The Legislature has selected the Energy Commission to develop this investment plan recommending allocation of the renewables funding. The Commission recommends that the funds be placed in the Renewable Resource Trust Fund established by SB 90 and continue to be administered by the Energy Commission with appropriate funding for administration approved through the Commission's regular budgetary process. Authority for administration and related activities should be made explicit by the Legislature.

Reporting Requirements

The Energy Commission is required by SB 90, the Supplemental Report of the 1999 Budget Act, and the RESIA to provide a variety of reports to the Legislature and Governor. These reports are as follows:

- The Energy Commission must submit quarterly reports to the Legislature describing the awards from the REP, cumulative commitment of claims by account, the relative demand for funds by account, a forecast of future awards, and other matters the Energy Commission determines may be of importance to the Legislature. (§445, subd. (g))

- The Energy Commission must submit an annual report to the Legislature describing the status of any transfers of funding or repayments between accounts. (§383.5, subd. (g))

- The Energy Commission must submit an annual report to the Legislative Analyst's Office beginning March 1, 2000 and then on each December 1 thereafter including itemized lists of projects awarded funding in the current and prior fiscal years. (Stat. 1999, Ch. 50, Item 3360-001-0381)

- The Energy Commission must submit a final report of its independent evaluation of the REP to the Governor and the Legislature no later than March 31, 2002. The independent evaluation is to be coordinated with the Department of Finance's annual report and the Energy Commission's biennial report (both of which are described above). The final report is to include legislative and non-legislative recommendations concerning improvements in funding, administration, and program scope, if the report recommends a continuation of the REP. (Stat. 1999, Ch. 50, Item 3360-01-0465, provision 2)

- The Energy Commission must submit a biennial report to the Legislature beginning May 31, 2000, and on or before May 31 of every second year thereafter, including description of allocation of funds between accounts, the need for reallocation of funds among accounts, and the allocation of funds from the interest on the Renewable Resource Trust Fund. (§383.5, subd. (g))

- The Department of Finance must conduct an independent audit of the Renewable Resource Trust Fund and provide an audit report to the Legislature beginning March 1, 1999 and not later than March 1 of each year thereafter. (§445, subd. (h))

- On or before January 1, 2004, the Governor must appoint an independent review panel of members with expertise in the energy field. This panel is required to prepare a report evaluating the energy efficiency, renewable energy, and research, development and demonstration programs funded by the RESIA, by January 1, 2005. (§399.8, subd. (f)(1))

The Commission believes that some of these reporting requirements are duplicative and unneeded. The Commission, therefore, recommends consolidating these reports as much as possible, while continuing to provide the necessary information at adequate intervals. The Commission further recommends that the program evaluation due March 31, 2002, be supplanted by the report of the independent review panel that is required by the RESIA.

Inflation Adjustments

The RESIA requires adjustments in the annual funding for the program at the lesser of "the annual growth in electric commodity sales or inflation, as defined by the gross domestic product deflator."[26] The manner in which the annual funding changes are determined and included in the Renewable Resource Trust Fund must still be worked out. Some questions remain to be answered, such as how to calculate "electricity growth" and whether that term includes direct access usage, customer-owned utility usage, or self generation. It is also unclear if the funding would be adjusted downward if electricity usage fell.

Many stakeholders stated that some of the program components – such as price caps, target prices, or incentive rates – should be adjusted for inflation as well. In general, the Commission is not inclined to have these program components adjusted for inflation, for reasons explained in the individual Fund chapters. The Commission, however, recommends that the target prices in the Existing Renewables Fund be increased to reflect inflation from 1996.

[26] §399.8, subd. (d)(2).

Mandated State Purchase of Renewable Energy

The RESIA states that the "investment plan shall also include an evaluation of and report to the Legislature regarding the appropriateness and structure of a mandatory State purchase of renewable energy."[27] State facilities (with the exception of the University of California and California State University campuses) receive bundled service from their local utility distribution companies (UDCs), which can be either IOUs or municipal utilities. According to comments submitted by the California Department of General Services (DGS), the State's experience with renewables in the direct access market has been "less than encouraging." Although renewable generation products are available through the DGS 1997 Master Services Agreement for electricity services, these products are typically priced higher than conventional generation products. State procurement rules do not allow State agencies to purchase goods or services at above-market prices except in special circumstances. In addition, the DGS electricity services program is voluntary; most customers who approached the program were looking for some type of discount from their current electricity service and were therefore not interested in higher-priced renewable products.

Because of the institutional and legal barriers of a State-mandated purchase of renewable generation, the Commission does not believe it is reasonable at this time to mandate State purchases of renewable energy. However, to the extent practical to do so, the Commission strongly encourages State entities to purchase renewable generation. The Commission believes a better course at this time is to explore alternative options. One possibility would be for the State to develop renewable, grid-connected distributed generation technologies at its own facilities. This option would add electricity capacity to California's power supply while offsetting the State's power consumption at those locations. In addition, this option would help stimulate the market for renewable technologies by providing demand for these products. Systems installed at State facilities that meet the eligibility requirements would also be eligible for buydowns from the Emerging Renewables Fund. This would reduce the cost to the State of the systems while increasing the likelihood of meeting the State's procurement rules regarding least-cost purchases of goods and services. For the same reasons, local governments, schools, and other public entities should be encouraged to develop renewable, grid-connected distributed generation technologies at their respective facilities.

The Commission will continue to evaluate this issue as the RESIA program is developed. To encourage this type of development, the Commission will also evaluate whether these public entities should be exempt from the residency requirement included in SB 90, and allowed to qualify for Emerging Renewables Fund funds even though they are located outside the service territories of participating IOUs. As part of its ongoing monitoring efforts, the Commission will evaluate whether State-mandated purchases are appropriate in the future and will make recommendations accordingly in its biennial reports to the Legislature. The first of these biennial reports is due to the Legislature in March of 2002.

[27] §399.6, subd. (e).

CHAPTER 3

NEW RENEWABLE RESOURCES

This chapter discusses the recommended allocation for new renewable resources, along with the rationale for that allocation, eligibility for funding, how funds will be distributed, and any potential changes to the fund over time.

Recommended Allocation

The Energy Commission recommends allocating 50 percent of the Reliable Electric Service Investments Act (RESIA) funding, or $337.5 million without considering other contributions or inflation adjustments, to production incentives for new in-state renewable electricity generation technologies. The allocation of 50 percent is based both on the objectives of the RESIA and on public comments received during the investment plan development process. According to the RESIA, the first objective of the investment plan "shall be to increase, in the near-term, the quantity of California's electricity generated by in-state renewable energy resources . . ."[28] The most straightforward way to meet this objective is to bring new renewable generation on-line and allow existing renewable generation to repower (thereby increasing efficiency and output). Parties who provided comments also generally agreed that the first priority in meeting the goals of the RESIA is investment in new and repowered renewable electricity generation.

The New Account to date has been successful in substantially increasing investment in new renewable power plants in California. In the first auction under the Renewable Energy Program (REP), the $162 million allocated to the New Renewable Resources Account was completely encumbered by prospective projects. In the second auction, funded with unused funds in November 2000 from the Existing Renewable Resources Account, the entire $40 million in auction funds was encumbered, while several nominally eligible projects remained unfunded. The results from these two auctions also support the recommended 50 percent allocation to the New Renewables Fund. A third auction using an additional $40 million in unused SB 90 funds is planned for early June 2001.

The initial allocation to new renewable technologies will allow the program to fund a large amount of new capacity, while the built-in program flexibility will allow those funds to be reallocated elsewhere if the expected new capacity does not fully materialize. A significant investment in new renewable development is necessary to meet the targets in the investment plan. Most of the increase in the percentage of renewable generation for consumption in California is expected to come from the proposed New Renewables Fund investment. Table 3-1 shows the recommended annual allocations for the New Renewables Fund , and the targeted increases in renewable generation that result from this investment.

[28] §399.6, subd. (a)(1).

Description of Fund

The New Renewable Resources Fund will provide new projects with generation-based production incentives. These incentives will be awarded through competitive auctions similar to the three auctions for new renewable resources conducted to date under the REP. These three auctions had largely similar structures and rules. The differences were reflections of the different market conditions, timing, and purpose at the time of each auction. The Commission recommends that much of the structure of previous REP auctions be kept in the RESIA auctions, including the basic first-price structure, the use of caps, limits on the duration of payments to establish the market as the main source of revenue for new projects, and the flexibility to design the specifics of the auctions to reflect goals and conditions relevant when each auction is held. However, the Commission recommends that, in contrast to the SB 90 program, facilities that have received Existing Account payments, or payments pursuant to the RESIA Existing Fund, do not have to repay these payments upon winning a conditional award in a New Fund auction.

Table 3-1
New Renewable Resources Fund By Year

	2002	2003	2004	2005	2006	Overall[29]
Allocation	50% $67.5 million	50% $67.5 million	50% $67.5 million	50% $67.5 million	50% $67.5 million	50% $337.83 million
Target (% of generation for California consumption)	1% 2,770 GWh 650 MW	2% 6,140 GWh 1,220 MW	3% 8,880 GWh 1,720 MW	4% 13,100 GWh 2,430 MW	5% 16,890 GWh 3,080 MW	N/A

The Commission recognizes that the unexpectedly high electricity prices seen from the summer of 2000 to the present time require strong consideration of a structure that will tie payments more closely to market prices to preserve funding when market prices provide adequate project support. The most visible and widespread indicator of market prices in California, the California Power Exchange (PX), ceased operation in the spring of 2001. The Commission believes that an appropriate indicator of market prices can be developed as market stability returns to California. Examples of potential indicators that the Commission will investigate include: the average Automated Power Exchange price, the short-run avoided cost price, the average Independent System Operator purchase cost or the Department of Water Resources purchase cost, a calculated price based on natural gas costs, or some combination of these. The Commission, however, recognizes that fixed-price contracts are likely to be the mechanism through which most new generators will sell their output. With fixed-price contracts, incentive payments tied to market prices have little value, since the facility is not receiving market prices.

[29] Overall funding includes $0.33 million in rollover from SB 90 funds, reflecting funds from one winning project in the first auction that cancelled its award after January 2000. Other projects from the three auctions may cancel their awards or be unable to generate sufficiently to receive their full awards. Should this happen, rollover would be greater. The percentages under the years 2002 through 2006 do not include the rollover estimate. The dollar amounts do not include other contributions or inflation adjustments.

The Commission is currently evaluating the alternative auction structures suggested by stakeholders for use in the RESIA auctions as the investment plan, subsequent program guidelines, and Notice of Auction protocols are developed. One such structure could be to have auction participants bid the target market price needed to support their facility, with the incentive being the difference between the bid target price and the actual market price, up to a maximum incentive. This alternative requires a robust indicator of market prices. Another possibility is to have a production incentive bid structure with a predetermined bid cap as in the current auction structure, but to also tie payment of the incentive to a Commission-defined index price for energy. Within this structure, the incentive would remain constant as long as the market price is below the index price, and would be zero when the market price becomes greater than the index price.

Some stakeholders suggested that there should be a limit on the amount of funding any single company (as opposed to any single project) can receive in an auction. The drawback of this policy is that the complexity of corporate structures makes it very difficult to ascertain whether or not seemingly distinct bidders are actually subsidiaries or affiliates of the same company. In addition, the primary objective of the RESIA to "ensure that the most cost-effective and efficient investments in renewable resources are vigorously pursued;" if a single company with multiple projects is a successful bidder (i.e. has outbid other participants) in an auction, that in itself is a measure of the cost-effectiveness of those projects.

Stakeholders also suggested that alternative auction structures would result in easier financing for projects. In particular, the structure where a bid "target price" provides a revenue floor for a project was suggested to provide superior revenue certainty for easier project financing. Experience with the current auction structure, however, suggests that financing difficulty has not been a significant issue prior to the energy crisis. Three of the winning bidders from the first auction cancelled their awards for various reasons, none of which included difficulty in obtaining project financing. While many projects have indeed delayed their on-line dates, those delays arose from problems with project permits, inadequate fuel sources, opposition from local residents or interest groups, changes in project ownership, obtaining transmission access, and acquiring long-term power purchase contracts, rather than from difficulties in securing project financing. While there are several auction winners currently experiencing difficulties related to project financing, the problems are connected to California's current energy situation rather than to payment periods or incentive levels.

To provide project proponents latitude to develop the most cost-effective projects, while at the same time ensuring that the promise of new generation is not delayed by unanticipated obstacles, the Commission also recommends allowing conditional funding awards from any auction to be transferred from one project to another under appropriate circumstances.

Eligibility for Funding

The Commission recommends that, as in the SB 90 program, eligible generation must come from facilities that are renewable, new, and free of active participation in a previous auction. Several changes in the definitions of these terms for purposes of New Renewables Fund eligibility are recommended in this investment plan. In addition, certain specific eligibility criteria are best

established in the proposed individual auction solicitations. For example, the on-line date after which a project in a particular auction is eligible must be determined once the auction date itself is established.

The Commission recommends the following eligibility changes from SB 90:

- Allowing on-site generation that is independently metered so that production incentives can be paid
- Allowing generation from projects that are outside California, but are interconnected to the grid within California, and isolated from local interconnection in their areas ("landlocked" facilities)
- Allowing generation from projects that are outside California, but have guaranteed contracts to sell their output to California customers
- Disregarding competitive transition charge (CTC) considerations when determining program eligibility
- Allowing generation from facilities that continue to have standard offer contracts with fixed capacity prices so long as those facilities have repowered as required to be considered new and the generation meets the requirements set forth in the RESIA[30]

These recommended eligibility changes will provide additional reliability, environmental, and local economic benefits from newly-eligible renewable generation. In the case of self-generation and landlocked facilities just outside of California, these benefits are largely equivalent to those from facilities already eligible; further, with independent metering information available, there is no reason to exclude these facilities. In the case of CTC constraints, the Commission believes that this barrier to participation has little or no justification in the post-2001 electricity market.

Regarding repowered facilities still in utility contracts with fixed capacity payments, the RESIA establishes that facilities that wish to repower or add separable improvements consistent with New Renewables Fund eligibility may receive funding from the New Fund only for the portion of additional generation that does not receive any capacity payments, unless the capacity of the facility has expanded by a significant amount within the constraints of the contract and to the extent that it represents generation above a calculated historical amount for the facility (in SB 90 auctions, such prospective repowers/additions were required to get out of their standard offer contracts).

Recommended Distribution Method

Funds will be distributed through a cents per kWh production incentive. Several stakeholders stated that the cap on incentive bids in the New Renewables Fund should be higher than the 1.5 cents per kWh cap in place in the two SB 90 auctions. Given the response to the past two auctions, the average incentive requested, the expectation for higher market prices in the near- to mid-term and the continued potential for cost-reduction in renewable technologies, the

[30] §399.6, subd. (c)(1).

Commission is not convinced of the need to raise the cap. The Commission, therefore, recommends that the 1.5 cents per kWh cap be continued for any auctions held with the RESIA funds. However, specific auction criteria may specify a lower cap if the market conditions seem to warrant such a change for a specific auction. In the "target-price" auction structure, whereby participants bid not a production incentive amount but a target market price above which they would receive no incentives, a higher per/kWh cap on incentives paid would be likely.

The production incentive will be paid to auction winners once projects have been constructed and are on-line generating electricity. Payments will be made for five years from the on-line date. The Commission recommends holding biennial auctions for new renewable resources rather than annual auctions or a single auction for all available funds. Holding fewer auctions could result in bidders simply raising their bids to take advantage of the higher amount of funding available. However, annual auctions could limit the amount of funding available for larger projects (such as geothermal facilities), particularly as projects will be limited to no more than 25 percent of the funds from each auction (as is currently required under SB 90). A biennial timeframe gives project developers the certainty of regular auctions while providing enough funding per auction to support a variety of technologies and project sizes. Biennial auctions would also spur new advances in renewable technology developments by making future funding available for new projects that incorporate these advances.

Potential Changes in Fund Over Time

Although it is unclear at this time how much interest there is in building new renewable generation in California, an evaluation of renewable technologies conducted by the Energy Commission in 1991 indicated technical potential for more than 15,000 MW of biomass, geothermal, small hydro, solar, and wind capacity in California.[31] The most recently completed New Account auction (November 15, 2000) also indicates that there is a willingness to develop new renewable projects, with more than 740 MW of capacity bidding an average incentive level of 0.9 cents per kWh to come on-line by June 2002. If, however, the development of new renewable projects loses momentum and developers bid less capacity into future auctions, the Energy Commission will still have the ability to reallocate funds set aside for new renewables to other areas within the program that may be oversubscribed.

Some stakeholders suggested that the cap for each auction (or other monetary criteria in an auction, such as a target price in a different auction structure) should be adjusted for inflation. Given that inflation will likely lead to higher market prices for energy to the same extent as increases in project costs, and that the incentive provided should be small in proportion to market revenue for a project, the Commission disagrees with this recommendation. In addition, keeping the cap constant encourages the continuing improvement of renewable industry cost effectiveness, and reflects the market-based nature of the program: the incentives act to encourage market development of new projects and inflation adjustments are left to the market to internalize in costs and revenues.

[31] *Technical Potential of Alternative Technologies – Final Report*, prepared for the Energy Commission by Regional Economic Research Inc. under contract No. 500-89-001, December 2, 1991.

CHAPTER 4

EXISTING RENEWABLE RESOURCES

This chapter discusses the recommended allocation for existing renewable resources, specifically biomass, solar thermal, and wind technologies, along with the rationale for that allocation, eligibility for funding, how funds will be distributed, and any potential changes to the fund over time.

Recommended Allocation

The Energy Commission recommends allocating 20 percent of the Reliable Electric Service Investments Act (RESIA) funding, or $135 million, without considering other contributions or inflation adjustments, to production incentives for existing renewable technologies, specifically solid-fuel biomass, solar thermal, and wind technologies.[32] The Commission believes that this allocation is sufficient to encourage existing facilities to repower, refurbish, and return to service, as well as to prevent facilities from shutting down or reducing generation due to insufficient revenue. The intent of the allocation is to meet the proposed target for existing facilities: a steady 12 percent of energy generated for consumption in California from existing facilities so that these facilities continue to provide system reliability and environmental benefits to California.

At the same time, the Commission has reduced the allocation from Senate Bill 90 (SB 90) levels because there are fewer *eligible* existing renewable technologies, and energy prices are expected to be higher over the five-year period covered by this investment plan, reducing the need for assistance from production incentives. The eligibility of existing technologies is reduced by the RESIA, which covers only solid-fuel biomass, wind, and solar thermal technologies. In addition, facilities are ineligible for assistance from the Existing Account while actively participating in the Central Valley Agricultural Biomass-to-Energy Incentives Program.

Short-run avoided cost (SRAC) prices have been above the SB 90 target prices for all tiers since June of 2000. The Power Exchange (PX) prices were also high, until the PX went out of business in March, 2001. The high market prices in 2000 and 2001 resulted in very limited production incentive paid from the Existing Account in 2000, and 2001 to date. The Commission expects that market prices will remain high for the remainder of this year and beyond, and therefore expects that the allocation to the Existing Renewables Fund, along with expected rollover from SB 90 funds, is sufficient to meet the expected Fund needs.

[32] The RESIA uses the term "existing" only with respect to the category "existing wind generating resources" (§399.6, subd. (c)(8)). However, the Commission believes that the legislative intent for the solar thermal and biomass categories was to consider support for existing power plants using those technologies, pursuant to the conditions established by the RESIA.

Although market prices for energy have been high in recent months, the financial difficulties experienced by the state's investor-owned utilities led to existing non-utility owned generators not yet being paid the full market price for their energy during November 2000 – March 2001. The millions of dollars owed but not yet paid to the existing renewable generators have resulted in a short-term severe financial crisis for some generators. Beginning in April 2001, however, the utilities began paying the generators prices well above the current target prices, and are expected to continue to pay from this point forward.

The Commission also recommends that any unexpended funds be rolled over to the following month within the same tier until the Commission determines through a public process whether funds should be reallocated to other Funds based upon the latest market conditions.

Table 4-1 shows the annual allocations recommended for the Existing Account and the targeted results of this funding.

Table 4-1
Existing Renewable Resources Fund By Year

	2002	2003	2004	2005	2006	Overall[33]
Allocation	20% $27 million	20% $27 million	20% $27 million	20% $27 million	20% $27 million	20% $135 million
Target (% of generation for California consumption)	12% 33,000 GWh 7,530 MW	12% 33,700 GWh 7,620 MW	12% 34,400 GWh 7,700 MW	12% 35,100 GWh 7,780 MW	12% 35,800 GWh 7,860 MW	N/A
Estimated Rollover: $0-$25 million[34]						

Description of Fund

The Commission recommends that the Existing Renewables Fund continue to provide existing projects with generation-based production incentives. Payments will continue to be tied to market prices, or other appropriate prices as determined by the Commission. Generators will receive payment from the fund only when they generate electricity, with more cost-effective facilities having more incentive to generate. As mentioned earlier, existing generators are currently receiving high market prices for their output, and consequently have not needed additional financial incentives. However, it is possible that these high prices will drop sharply in response to events in the market such as increased capacity from natural gas-fired generation or regulatory intervention. In that case, existing renewable generators could have difficulty surviving on market prices alone and would need the incentives to maintain their financial viability.

[33] The percentages under the years 2002 through 2006 do not include the rollover estimate. The dollar amounts do not include other contributions or inflation adjustments.
[34] The rollover estimate reflects forecasts of market prices in 2001, and historic generation data from projects participating in the Renewable Energy Program.

The Commission recommends that the RESIA program design should be flexible enough to allow modifications to the parameters (such as target prices, market prices, and caps) of the Existing Renewables Fund as needed to address changing market conditions. One example of a situation that could trigger a change in program structure is a reconsideration of the fixed price contracts for existing renewable facilities that were considered in early 2001. In this case, production incentives based on target prices may provide little benefit to the industry and the State. In addition, there is the potential for further nonpayments, such as those that occurred in 2001 due to the electricity market crisis, and the ability alter the program to provide assistance where market prices are high but not being paid would be useful. In short, the Commission recommends that the program structure should be flexible enough to define "market price" as something other than short-run avoided cost as defined in section 390 of the Public Resources Code, and to establish loan or insurance structures as needed to protect against situations such as nonpayment. In general, any change in the program structure must be open to or targeted to all facilities and tiers, not to individual facilities or groups of facilities.

The Commission recommends continuing the tier structure used successfully in the SB 90 program that was based on the relative competitiveness and different funding needs of the eligible technologies. Biomass and solar thermal facilities are placed in Tier 1 and will receive 15 percent of the RESIA funds. Wind facilities fall under Tier 2 and will receive the remaining five percent.

Eligibility for Funding

RESIA restricts the eligibility for Existing Renewables Fund support to existing solid-fuel biomass, solar thermal, and wind resources. "Existing" here has the same meaning as in the SB 90 program – built and generating power for sale before September 26, 1996. Even with these technologies, however, the RESIA requires the Commission to make findings concerning the eligibility of the resources. First, the Commission must determine that existing solar thermal resources "enhance the environmental value or reliability of the electricity system and that require financial assistance to remain viable."[35] Second, the Commission must determine that existing wind facilities are "a cost-effective source of reliability and environmental benefits compared with other eligible sources," and that they "require financial assistance to remain economically viable."[36] And, finally, the Commission must determine that incentives are appropriate for reducing confirmed fuel costs at solid-fuel biomass facilities to "provide demonstrable environmental and public benefits, including but not limited to air quality improvement."[37]

The RESIA also established criteria by which a portion of existing facility generation could be eligible for the New Fund, as part of a facility repowering efforts. The Commission intends that the remainder of the generation from such facilities – that not eligible for the New Fund – remain eligible for the Existing Fund.

[35] §399.6, subd. (c)(6).
[36] §399.6, subd. (c)(8).
[37] §399.6, subd. (c)(5).

Solar Thermal Findings

The RESIA directs the Commission to determine whether funding should be allocated to solar thermal generating resources that enhance the environmental value or reliability of the electricity system and require financial assistance to remain economically viable. Since peak output from solar thermal facilities corresponds with peak electrical demand, these facilities provide a clean source of reliable capacity when it is most needed. The problems associated with ground level pollution or smog are most prevalent when temperatures increase, which also corresponds with a greater demand for electrical power. Because of the nature of their primary fuel (the sun), solar thermal facilities tend to operate near full capacity during these times, providing substantial system reliability while producing low amounts of pollution. In the 1997 *Policy Report on AB 1890 Renewables Funding*, the Commission determined that solar thermal facilities required assistance at a level similar to that of biomass facilities. The Commission has not observed changes in the financial viability of solar thermal facilities over the past few years that would indicate that any change in the level of financial assistance needed by these facilities, and therefore recommends the allocation of funds to solar thermal facilities.

Wind Findings

The RESIA also directs the Commission to allocate funds to existing wind facilities if the existing wind-generating resources are determined to be a cost-effective source of reliability and environmental benefits and require financial assistance to remain economically viable. Although wind facilities are an intermittent resource and do not provide as much generation per megawatt (MW) of installed capacity as other technologies, the large amount of installed wind capacity means their contribution to California's system reliability cannot be discounted. A significant portion of wind generation coincides with typical summer system peak, and California has this last year experienced available capacity shortages and periodic rolling blackouts at many times other than the traditional summer system peak. In fact, there was a recent incident in which a blackout was avoided because the wind picked up in the evening and additional wind generation was provided to the system.

In addition, wind facilities provide environmental benefits because they produce electricity while emitting few or no pollutants, and can also displace the need for generation from higher polluting fossil facilities. Since wind facilities generally require a lower amount of income on a per kilowatt-hour basis than biomass or solar thermal facilities, wind facilities will likely require and receive less funding on a cents per kilowatt-hour basis. This can be observed by comparing the average incentive payments made to wind, biomass, and solar thermal facilities from the SB90 funding. Therefore, the Commission believes that wind-generating resources provide a cost-effective source of reliability and environmental benefits when compared with other eligible sources.

Finally, the question of whether existing wind-generating resources need financial assistance is fully dependent upon market prices. At higher market prices, no financial assistance is needed, but if the market price falls low enough, financial assistance is beneficial. The Commission believes that at market prices less than the target prices established in the program, existing wind

facilities require financial assistance to continue providing cost-effective reliability and environmental benefits to California, and recommends the allocation of funds to wind facilities. Should market prices remain above the target prices established, than these funds can be reallocated as specified in the investment plan to foster additional renewable generation in California.

Biomass Findings

Finally, the RESIA states that the Commission must determine that providing incentives to reduce or offset confirmed fuel costs at solid-fuel biomass facilities will result in demonstrable environmental and public benefits, including but not limited to air quality improvement. Biomass facilities purchase and burn agricultural, forest and urban wastes that would otherwise be burned in open fields or in forest fires, or disposed of at landfills. The pollutants emitted from converting biomass wastes to electricity are lower than the pollutants emitted in the alternative disposal methods because of the pollution control systems that are required at these generating facilities. Also, using forest wastes to generate electricity helps reduce the potential for forest fires. Although forest fires are unpredictable phenomena, they typically destroy large areas of forest and emit large quantities of harmful pollutants into the atmosphere. The Commission has therefore determined that biomass facilities provide environmental benefits, and recommends that biomass facilities receive production-based incentives in a similar fashion to the incentives paid through SB 90.

Although the RESIA requires incentives to reduce fuel costs to solid-fuel biomass facilities, the Commission believes this can essentially be accomplished by providing a production incentive rather than providing incentives based on fuel purchases. In the Commission's view, the intent of the legislation is to allow biomass facilities to purchase additional higher cost fuels, which results in additional renewable generation. Providing a generation-based incentive, which then allows biomass facilities to purchase higher-cost fuels, obtains the same result as providing an incentive that lowers the cost of the fuel. A production-based incentive also enables the Commission to guarantee that the funds have contributed to the production of renewable electricity.

Some biomass facilities have a lower core fuel cost which may allow them to operate at some level without additional incentives. However, to operate at levels approaching 100 percent of their capacity, almost all biomass facilities must compete to obtain higher cost fuels. The further facilities must go to obtain fuel, the higher the overall cost of the fuel becomes, primarily due to increased transportation costs. The biomass industry has demonstrated to the Commission that the cost of obtaining these marginal fuels is approximately 3.5 to 5.0 cents per kilowatt-hour, including collection, processing, and delivery costs.

Eligibility Changes

The Commission also recommends the following eligibility changes in this Fund from SB 90:

- Making any facility under a high fixed price contract, as defined by the Commission, ineligible for Existing Renewable funds

- Allowing generation from projects that are outside California, but are interconnected to the grid within California, and isolated from local interconnection in their areas (i.e., "landlocked" to California's transmission grid)

- Disregarding competitive transition charge (CTC) considerations when determining program eligibility

- Making facilities actively participating in the Central Valley Agricultural Biomass-to-Energy Incentive Program ineligible for Existing Renewable funds

These changes will allow the provision of additional reliability, environmental, and local economic benefits from existing renewable generation, while ensuring that facilities with high fixed price contracts with entities other than an investor-owned utility (IOU) do not receive unneeded incentives. In the case of "landlocked" facilities just outside of California, benefits from these facilities are largely equivalent to those from facilities already eligible, and with independent metering information available, there is no reason to exclude these facilities. In the case of CTC constraints, the Commission believes that this barrier to participation has little justification in the current electricity market.

Existing law establishes the Agricultural Biomass-to-Energy Incentive Grant Program which provides incentives to buy down the cost of certain biomass fuels. [38] This law prohibits any facility that receives any funding under the Agricultural Biomass-to-Energy Program from receiving funding under any other program that is funded through electricity surcharges, starting January 1, 2002.[39] The Commission recommends that any facility that participates in the Biomass-to-Energy Program in one year, but declines to participate the following year, or upon termination of the Biomass-to-Energy Program, shall be eligible to apply for the Existing Renewables Fund when no longer receiving funding under the Biomass-to-Energy Program.

Recommended Distribution Method

Funds will be distributed through a cents per kilowatt hour (kWh) production incentive for verified eligible renewable generation. The method of fund distribution should be similar to the process used in the SB 90 program. The incentive rate will be based on the difference between a tier-specific target price and the market price (short-run avoided cost or other appropriate price as determined by the Commission), subject to a cap. If funds are unavailable to pay facilities at these levels, the incentive will be adjusted to reflect the amount of funds available. A summary of the target prices and the caps for biomass/solar thermal facilities and wind facilities is presented in Table 4-2.

During the review process, several parties requested that the target price and cap be escalated for inflation. The Commission understands that the production costs of existing facilities tend to increase as the costs of underlying inputs increase. Offsetting this tendency to increase is the potential for improvements in productivity – producing more output with a constant or

[38] Food and Agricultural Code §1101, et. seq.
[39] Food and Agricultural Code §1104, subd. (g).

decreasing amount of input. The Commission believes that keeping the target prices constant provides an incentive for existing facilities to improve productivity so that they can continue to remain viable if input costs increase. Consequently, the Commission is disinclined to adjust target prices on an annual basis for inflation. However, the Commission believes that an increase in the target prices established for the RESIA program is justifiable, and will set these target prices at higher than SB 90 levels to account for past inflation. The fixed target prices presented in Table 4-2 and discussed below have taken an escalation factor into account. By setting a fixed target price rather than an price escalating with inflation, the Commission is indicating its belief that further productivity increases for existing facilities are achievable over the first five years of the RESIA program, accounting for the higher fuel costs that are currently present in the marketplace.

Table 4-2
Recommended Target Prices and Caps
(cents per kWh)

			2002	2003	2004	2005	2006
Tier 1	Biomass and Solar Thermal	Target Price	5.5	5.5	5.5	5.5	5.5
		Cap	1.0	1.0	1.0	1.0	1.0
Tier 2	Wind	Target Price	3.8	3.8	3.8	3.8	3.8
		Cap	1.0	1.0	1.0	1.0	1.0

The Commission believes that the price caps included in the Existing Renewables Fund do not need to be adjusted for inflation. These caps are not tied to industry costs or to inflationary pressures in any sense. They represent the maximum amount that the State has indicated it will provide in production incentives, regardless of how low market prices may fall or how much industry costs may increase. Given the intent of the program that existing facilities should continue to increase in productivity (or become more cost-effective) to reduce the need for incentives, the Commission believes that the price caps established for SB 90 are still relevant and should remain at that level for the RESIA program.

The recommended target price for biomass and solar thermal technologies is 5.5 cents per kWh, with a cap of 1.0 cent per kWh. Under SB 90, the target price decreased with the expectation that cost-shifting would occur. When this failed to occur and target prices for Tier 1 technologies dropped under the SB 90 program, biomass facilities were unable to generate as much electricity. Furthermore, the only biomass facility that ceased operations while participating in the program did so after the target price was dropped to 4.0 cents per kWh. In an effort to increase generation from biomass facilities, the Commission raised the target price for Tier 1 technologies back to 5.0 cents per kWh in October 2000. Since the increase, several biomass facilities have indicated plans to reopen this summer. The Commission will also monitor cost-shifting activities, and may reduce the target prices as warranted.

For wind facilities, the Commission recommends that the target price and cap be set at 3.8 cents per kWh hour and 1.0 cent per kWh, respectively. According to the wind industry, the SB 90 payments to existing wind generators helped reverse the trend of declining production from wind facilities. The Commission's data show that wind energy generated in California reversed a short-term decline in 1998 and began growing. In 1999 and again in 2000, wind facilities generated more energy in California than in any previous year. Before 1998, rather than repair broken turbines, some operators of wind facilities removed the working components from broken turbines and used them to keep other wind turbines in operation. In time, this led to fewer operating turbines, reducing the amount of generation from wind facilities. The incentives from the SB 90 program have enabled operators to repair turbines with new parts as well as to repower some facilities (removing old turbines and replacing them with newer, more efficient turbines). More than 200 MWs of wind capacity participating in the Existing Renewable Resources Fund has been repowered, which has resulted in an overall increase in generation from these facilities. The adjusted target price should enable existing wind facilities to continue to increase generation, and as the financial situations of these facilities stabilize, they should be able to replace older turbines with newer, more efficient ones.

Potential Changes in Fund over Time

The RESIA requires the Commission to make certain findings regarding the eligibility of existing solid-fuel biomass, solar thermal, and wind technologies. The Commission has determined that all three of these technologies are eligible for Existing Renewables Funding and has recommended an allocation of 20 percent of the overall fund. A great deal of uncertainty over the final appearance of the electricity market still remains and therefore this allocation may need to be revisited and modified. Several fixed price payment schemes to all qualifying facilities under contract with the state's IOUs have been proposed over the past few months, and although none has been adopted at this time, this possibility still exists.[40] If a fixed price above the Commission-recommended target prices is adopted at some time in the future, it will be necessary to reallocate the funding accordingly. Because of this high degree of uncertainty that still remains, it is critical that the Commission maintains a high degree of flexibility in reallocating funds as market conditions change.

[40] For example, Senate Bill 47X (Battin) set the SRAC for non-gas-fueled qualifying facilities at 5.37 cents per kWh for the period of February 2001 to January 2006.

CHAPTER 5

EMERGING RENEWABLE RESOURCES

This chapter discusses the recommended allocation for emerging renewable resources, along with the rationale for that allocation, eligibility for funding, how funds will be distributed, and any potential changes to the fund over time.

Recommended Allocation

The Energy Commission recommends allocating 15 percent of the Reliable Electric Service Investments Act (RESIA) funding, or $101.25 million, without considering other contributions and inflation adjustments, to buydown incentives and other support mechanisms for emerging in-state electricity generation technologies. The RESIA requires the Commission to "identify and support emerging renewable energy technologies that have the greatest near-term commercial promise and that merit targeted assistance."[41] The RESIA also requires the Commission to include specific targets for the "increased quantity of California electrical generation produced from emerging technologies."[42] The Commission believes that the emphasis on emerging technologies in the RESIA supports increasing the allocation for the Emerging Renewable Resources Fund from the Senate Bill 90 (SB 90) level of 10 percent, even though a substantial portion of the SB 90 allocation to the Emerging Renewable Resources Account remains unspent at present.

The Commission recommends that any unused funds left in the SB 90 Emerging Renewable Resources Account that remain unencumbered by the end of 2001 be rolled over as an initial allocation for the Emerging Renewables Fund. Despite this initial allocation and the rate at which Emerging Renewable Resources Account funds have been historically encumbered, the Commission believes the Emerging Renewables Fund will need a higher allocation due to increased demand as result of the current energy situation in California. The Commission, therefore, recommends an annual allocation of RESIA funds for the Emerging Renewables Fund that begins at 15 percent, to be reviewed for reasonableness along with the review of the allocation to other renewable accounts on a annual basis. Table 5-1 shows the annual allocations recommended for the Emerging Renewables Fund, along with expected SB 90 rollover funds.

The Commission's March 1997 *Policy Report on AB 1890 Renewables Funding*, which was incorporated by reference in SB 90, stated that the first three percent of rollover funds available at the end of the transition period would be used to augment the Emerging Renewable Resources Account. However, given the $30 million dollar augmentation of that Account from Assembly

[41] §399.6, subd. (a)(2).
[42] §399.6, subd. (a)(3)(A).

Bill 29X,[43] as well as the addition of RESIA funds for the 2002-2006 period, the Commission no longer believes this augmentation is necessary.

Table 5-1
Emerging Renewable Resources Fund By Year

	2002	2003	2004	2005	2006	Overall[44]
Allocation	15% $20.25 million	15% $20.25 million	15% $20.25 million	15% $20.25 million	15% $20.25 million	15% $101.25 million
Target (% of generation for California consumption)	0% 40 GWh 25 MW	0% 130 GWh 75 MW	0% 310 GWh 175 MW	0% 740 GWh 425 MW	1% 1,620 GWh 925 MW	1% 1,620 GWh 925 MW
Estimated Rollover[45]: $0-$45 Million						

Although the SB 90 Emerging Renewable Resources Account had limited participation as of the end of 2000, the heightened energy problems in the state have caused many electric customers to seek alternate sources of power, including technologies funded by the Emerging Renewables Resources Account. Compared with program participation in 2000, reservations for funds in 2001 have increased tenfold and are expected to increase even more as a result of higher rebates, increased program awareness, and continued concern about future electricity supplies and prices In addition, the expanded eligibility recommended for the Emerging Renewables Fund should also lead to increased Fund activity.

The Commission also recommends altering the division of funds within the Emerging Renewables Fund. SB 90 directed the following:

- At least 60 percent of funding go to small systems (10 kilowatts [kW] or less)
- At least 15 percent go to medium systems (100 kW or less)

Under SB 90,the remaining 25 percent could go to large systems, 100+ kW or larger. The Commission believes that two changes should be made in this allocation structure. First, only two categories – small and large – should be included in the RESIA buydown program. Second, the difference between small and large systems should be increased so that systems less than 30 kW are defined as small, while systems greater than or equal to 30 kW are defined as large. This split in system size reflects the minimum size of 30 kW for renewable systems established by the California Public Utilities Commission (CPUC) in their new distributed generation program. At this time, the Commission recommends continuing to reserve 60 percent of the funds for small systems, as in the SB 90 program, leaving 40 percent available to larger systems. While

[43] Stat. 2001, Ch. 8
[44] The percentages under the years 2002 through 2006 do not include the rollover estimate. The dollar amounts do not include other contributions or inflation adjustments.
[45] The rollover estimate is based on the total allocation to the Emerging Account from the beginning of the SB 90 Renewable Energy Program minus disbursements and reservation requests granted (but not yet paid) as of June 2001.

reservations for small systems were low in the initial years of the SB 90 program, in 2001 there was a significant increase in activity for both small and large systems. A reserved allocation for small systems has and will continue to preserve funds for the ongoing and increasing demand in this sector. The Commission believes that the demand for large systems for the remainder of 2001 could well exceed the funds available to large systems in the SB 90 program. While smaller systems currently have no other significant options for funding, large systems will be able to receive buydowns from the CPUC distributed generation program when it is implemented. The Commission recommends allowing those percentages to be changed if needed in response to market conditions or the availability or lack thereof of incentives from other programs.

Finally, the Commission recognizes that emerging technologies generally require a long time period to become firmly established in the market and expects that market penetration will exhibit an exponential pattern of growth similar to most successful new consumer products. In addition, flexibility to review and revise the allocation of all funds in the Renewable Resources Trust Fund as deemed necessary will ensure that funding can be redirected if market conditions change.

Description of Fund

The Emerging Renewables Fund is designed to spur investment in specific renewable technologies that hold promise of providing viable generation alternatives to central station power, and in which electric customers can invest for on-site or local distributed generation. The goal of the Fund is to develop a healthy, economically sustainable market for these technologies through financial incentives that encourage both supply-side and demand-side expansion. The Commission recommends structuring the Emerging Renewables Fund largely as a buydown program similar to the SB 90 Emerging Renewable Resources Account but with expanded eligibility and revised incentive structures.

Prior to 2001, activity in the SB 90 Emerging Renewable Resources Account was low compared to the available funds. The discrepancy in activity versus funding led to recommendations for increases in the buydown levels, additional performance-based incentives, financing programs, manufacturing incentives, and other programs aimed at reducing barriers to market acceptance of emerging systems. In 2001, however, program activity increased to the point that the discrepancy no longer exists. In addition, some of the additional incentives originally recommended were implemented through legislation, changes to the Emerging Buydown program, and related (but independent) programs. Financing programs have been enacted by Senate Bill 6X[46] and Assembly Bill 29X,[47] and are in the process of being developed. Other bills, pending and enacted, address standby and interconnection fees, tax effects, and code or neighborhood conventions that affected emerging installations. The Emerging Buydown program increased rebate amounts for both large and small systems and relaxed some eligibility rules. The Commission was given legal authority to establish higher rebate levels for specified categories of customers, such as public or non-profit entities. The Commission has increased its efforts to provide training programs for system installers and for building inspectors. A significant additional incentive program has been established by the CPUC, interconnection fees and

[46] Stat. 2001, Ch. 3.
[47] Stat. 2001, Ch. 8.

protocols were standardized for utilities regulated by the CPUC, and non-CPUC regulated utilities have increased their programs addressing emerging renewable technologies.

Since there is significant additional program activity addressing emerging systems in place or pending in California, the Commission sees no need at this time to allocate emerging funds to proposed programs other than the basic buydown program. Given the volatility in the market, however, and the possibility that some of the pending initiatives may not be established, the Commission recommends that the program have the flexibility to respond to market needs not addressed by the buydown program. Specifically, the Commission recommends that up to 15 percent of the allocation for the RESIA Emerging Renewables Fund could be used to fund additional incentives targeted towards the manufacturing, financing, sale, or performance of emerging generation systems in the State. Examples of potential incentives include:

- Low-cost loans, financing, or underwriting programs where existing loan programs have left portions of the market unserved
- Incentives for in-state manufacturing of or in-state installation infrastructure for emerging systems
- Addressing income tax, property tax, and regulatory/permitting concerns affecting emerging systems
- Establishing incentives that target maximizing performance of installed emerging systems
- Alternative incentive programs for qualified non-profit entities

Eligibility for Funding

SB 90 directed that four technologies would be eligible for funding under the Emerging Account: photovoltaics, small wind (10kW or less), fuel cells using renewable fuels and solar thermal electric generation. SB 90 also required generating systems to be located on the premises of the end-use customer and that systems must be sized to predominately offset the customer's load.

The Commission recommends that eligibility for the Emerging Renewables Fund be expanded from the constraints in place in the SB 90 program. These eligibility expansions are supported by the objectives of the RESIA and the experience of implementing the SB 90 program.

First, RESIA requires the Energy Commission to *identify* emerging renewable resource technologies, perhaps implying a directive to go beyond the four technologies established in SB 90. The RESIA also directs the Energy Commission to consider specified fuel cell technologies for eligibility for funding from the program. While the RESIA does not explicitly state that these fuel cell technologies be considered as emerging, the emerging designation seems to be most apt if these technologies are included in the RESIA program. During workshops held to gather input on the investment plan, stakeholders stated that technologies such as microturbines using a renewable fuel be included in the program.

The Commission, therefore, recommends that, in addition to the four technologies established as emerging by SB 90 – photovoltaics, small wind, solar thermal (electric), and fuel cells that use a renewable fuel – other technologies be considered under the extension program. To identify other prospective emerging technologies, the Commission recommends borrowing from the criteria expressed in the March 1997 *Policy Report on AB 1890 Renewables Funding*:

1) The technology must be commercially available with at least one vendor available for the sale of the system.

2) Vendors of any generating systems employing the technology must offer at least a five year full warranty on the entire generating system.

3) The technology must show at least one year of demonstrated reliable, predictable, and safe performance by a full-scale facility using this technology under field conditions.

4) The available data must show that generating systems using the technology have a useful design life of at least 20 years.

5) The technology must be designed so that it can produce grid-connected electricity.[48]

6) The technology represents a new electricity generating process not well-represented among existing grid-connected renewable generating facilities, rather than some evolutionary or incremental improvements to renewable technologies used in existing renewable resource technology generating facilities (examples of such evolutionary or incremental improvements will be a) an improved blade design for wind turbines, b) less expensive well drilling techniques for geothermal, or c) a more efficient burner design for a biomass plant).

7) The project must be designed exclusively for the purpose of producing electricity for on-site use or sale (excluding demonstration projects that may sell to one specific customer), in contrast to a research or demonstration facility, which is designed primarily for collecting additional research data.

The RESIA implied that another criterion may be reasonable to employ in this identification process. In assessing specified fuel cell technologies, the Energy Commission is required to find, among other things, that financial assistance is required for these technologies to become commercially viable. The Commission recommends that this criterion be applied to all technologies that may be identified as eligible for the Emerging Renewables Fund, and be used to determine whether additional technologies are eligible for assistance and whether technologies that are eligible should continue to receive assistance.

The Commission also recommends that small wind systems up to 50 kW or less be eligible for the program, rather than the present limit of 10 kW or less. Stakeholders commented that the 10

[48] While technologies must be designed to produce grid-connected electricity, individual systems may be eligible for funding even through they are not physically grid-connected where the documented cost of establishing a physical connection is less than the unsubsidized cost of the otherwise eligible system. Note, this grid-connection criteria varies from the criteria included in the March 1997 *Policy Report*, which excluded systems that were not grid-connected because they were deemed to be cost-effective, did not need financial assistance, and the end users were avoiding CTC payments.

kW limit prevented some applications of systems that should be considered in the same category as the under-10 kW systems. These systems could be installed at commercial business or community sites where 10 kW or less systems may be less appropriate or cost-effective. The Commission seeks discretion to lower the maximum size of wind turbine considered eligible as needed to coordinate with other incentive programs, such as the CPUC's distributed generation program.

Recommended Distribution Method

The Commission recommends that the primary distribution method for the Emerging Program remain a buydown or rebate to reduce system-installed costs, consistent with the SB 90 program. The proposed buydown amounts at the beginning of the program are provided in Table 5-2.

Table 5-2
RESIA Buydown Program Parameters

Category	Rebate
Small Systems (<30 kW)	The lesser of $4.50 /watt or 50% of total installed costs
Large Systems (>=30 kW)	The lesser of $4.50 /watt or 50% of total installed costs

The rebate levels will be reevaluated on a periodic basis by the Commission to determine their appropriateness, and revised as necessary to provide the correct signals to the market. The Commission recommends continuation of the flexibility recently added to the SB 90 program that allows higher rebates to be established for certain categories of customers, such as public entity or non-profit customers. At this time, however, the Commission is not prepared to recommend or establish higher rebate levels. As mentioned earlier, the Commission recommends that up to 15 percent of the funds allocated to the Emerging Renewables Fund be available for alternative incentive programs to meet market needs.

Potential Changes in Fund Over Time

The RESIA Emerging Renewables Fund, like the SB 90 Buydown Program, has a goal of increasing demand for emerging technologies by reducing capital costs to the consumer, thereby providing incentives for additional supply infrastructure to develop and bring installed system costs down over time in California. Reducing the up-front capital costs of the systems addresses a key barrier for the emerging market – high capital costs of these systems. However, since the buydowns are provided at the time of system installation, there is a question about how well the systems are performing over time, leading to statements by some stakeholders that performance incentives should be included in the future. In addition, the higher rebates and increased activity in the market today have raised some concerns among stakeholders about the potential for increased system costs and reduced quality (leading to reduced performance) of newly installed systems.

The Commission has addressed system performance concerns in the SB 90 program through program features such as requiring professional licensing of system installers (unless self-installed), requiring a five-year warranty for installed systems, and requiring that eligible systems be either UL certified or be able to demonstrate one year of reliable performance in a typical market installation. These features of the SB 90 program will be continued in the RESIA program.

The Commission believes that the consumers, installers, and manufacturers of emerging systems have high interest in ongoing system performance. The benefit that consumers receive from their systems comes from reduced electricity bills – reduced in proportion to system performance. Even with significant buydowns, emerging systems are not cost-effective to consumers unless they perform over time to reduce electricity costs. Manufacturers and installers have a business interest in providing quality products if they want to remain in business. However, the Commission recognizes that consumers may not readily know how well their systems are performing, and may not therefore raise concerns about poorly performing systems. The Commission is considering ways in which consumers' awareness of the performance of the emerging systems can be enhanced, including:

- Require eligible systems to include a consumer-friendly meter or feedback system to let consumers easily monitor the performance of their systems

- Require sellers of systems to include their best estimate of annual system production on the reservation form. This estimate would be used to determine eligible system size relative to customer load and to provide a measure whereby the 5-year warranty against undue system degradation or performance problems could be enforced. Sellers would have an incentive to provide reasonable estimates of system performance: too high and they raise warranty, customer satisfaction, and eligibility issues; too low and they reduce the customers' inclination to purchase the system.

- Increase the number of systems the Commission verifies with on-site visits and provide increased feedback about problem systems to the consumers, the manufacturers, retailers, and the public in general.

- Revise consumer brochures, guidebooks, and marketing campaigns related to emerging systems to include greater emphasis on performance characteristics of systems.

Through the SB 90 Emerging Buydown Program, the Commission has compiled data on system costs as they have changed over the last three to four years. The Commission will continue to gather information on costs and market penetration of the emerging technologies as the RESIA Emerging Renewables Fund progresses. The Commission believes indications that installed system costs are increasing, rather than decreasing as is the program goal, will provide sufficient cause to reevaluate the program structure and determine whether the program should be modified. In addition, the Commission believes that robust competition will be a key factor in bringing system costs down. To assist this competition, the Commission is exploring methods of making information about system costs available to consumers in a simple, friendly fashion.

The Commission recommends that the dollars per watt buydown of system-installed costs not be adjusted for inflation to further encourage these systems to become more cost-effective over time. In addition, the intent of the rebate is to stimulate sales of emerging systems to encourage manufacturers, sellers, and installers to expand their operations and reduce their costs. Increasing the rebate amount for inflation is therefore inconsistent with program design, since the level of buydown payment should tend to decrease over time.

CHAPTER 6

CUSTOMER CREDITS

This chapter discusses the recommended allocation for customer credits, along with the rationale for that allocation, eligibility for funding, how funds will be distributed, and any potential changes to the fund over time.

Recommended Allocation

The Energy Commission recommends allocating 10 percent of the Reliable Electric Service Investments Act (RESIA) funding, or $67.5 million, without considering other contributions or inflation adjustments, to the Customer Credit Fund.[49] The allocation of 10 percent reflects experience from the Senate Bill 90 (SB 90) program, public comments received during the investment plan process, and the reduced participation in the direct access electricity market as of the year 2001.

Under the SB 90 program, the allocation for customer credits was initially eight percent in 1998, increasing annually such that the allocation was 20 percent by 2001, with an average overall funding level of 14 percent over four years. The ramping up of funding was intended to allow for anticipated market growth; that growth was realized and exceeded expectations until the direct access market declined at the close of year 2000 in response to the problems facing California's electricity system.

Beginning in the summer of the year 2000, changes in the electricity market made it more difficult for Electric Service Providers (ESPs) to offer electricity to direct access customers in California. Most renewable providers were able to persevere through November 2000, at which time 19 ESPs were offering renewable electricity and customer credits to approximately 188,000 customers. As of April 2001, less than ten ESPs continued to serve customers with renewable electricity, and even those providers had returned a portion of their customers to the default utility distribution companies (UDC). Each renewable provider had unique reasons compelling it to return some portion of its customers to the default UDC, or to exit the market. Generally, however, the deciding factors were rising wholesale electricity prices, financial exposure due to penalties for under or over scheduling energy, the demise of the California Power Exchange which had been the price index for many renewable electricity products, SB 90 caps on funding to non-residential and non-small commercial customers, and uncertainty over how legislative and regulatory proposals to change market rules would unfold. Although many renewable providers have exited the market, most have plans to return if conditions become more favorable, and some may continue to accept new customers on a limited basis.

The electricity market events of the last year have altered the policy basis for the Customer Credit Account substantially. The Commission's 1997 *Policy Report on AB 1890 Renewables*

[49] Under SB 90, this program was referred to as the "Customer Credit Subaccount;" under the RESIA, it is referred to as the "Customer Credit Fund."

Funding recommended a Customer Credit Account in response to AB 1890 and to help develop a vibrant consumer-driven market for renewable electricity. The report stated that this market implied moving away from standard offer utility contracts to direct market transactions. The potential for existing renewable facilities to change from standard-offer based markets to direct-access based markets was a clear policy basis for establishing the Customer Credit Account.

Today, however, it is less clear. One of the difficulties in the current electricity market is the lack of capacity dedicated through long-term contracts to the core customers in California at reasonable prices. Today, the standard offer contracts represent a significant amount of long-term dedicated contract supply at prices that are often significantly less than market prices. At this time it would appear to be counterproductive to offer inducements to existing facilities to leave their contracts and enter the direct access market. At the same time, while there appears to be substantial potential for new renewable development as evidenced by the Commission's New Account auctions, these facilities have experienced difficulty in entering the uncertain electricity market of today. Standard offer contracts are not available to these new facilities.

The Commission recommends altering the Customer Credit Account by limiting eligibility, starting in the year 2003, to only the first five years of generation from any in-state renewable facility. The intent here is to address the current market realities with the Customer Credit Account by fostering the marketability of new renewable generation. The Commission recommends beginning this policy in 2003, rather than 2002, for two reasons. First, the Commission is not confident that sufficient new generation will be available (free from contractual obligations outside the direct access market) in 2002. Second, beginning in 2003 provides for a grace period for the current contracts between marketers and existing generation. The recommended allocation of 10 percent, therefore, is intended to allow the program to provide consistent support after year 2001 for those customers who continue to purchase renewable electricity through direct access contracts and to provide some assistance to providers who may re-enter the market, while at the same time fostering the establishment of contracts with new renewable generation. The fixed annual allocation of 10 percent (with no ramping) will allow for some market growth without resulting in a sudden drop in the credit level. If , however, the market grows rapidly, participants may expect to see a reduced credit level, or changes in the eligibility criteria.

Table 6-1 shows the annual allocation recommended for the Customer Credit Fund, along with expected rollover from SB 90 funds.

Table 6-1
Customer Credit Fund By Year

	2002	2003	2004	2005	2006	Overall[50]
Allocation	10% $13.5 million	10% $13.5 million	10% $13.5 million	10% $13.5 million	10% $13.5 million	10% $67.5 million
Estimated Rollover: $9 million						

[50] The percentages under the years 2002 through 2006 do not include the rollover estimate. The dollar amounts do not include other contributions or inflation adjustments.

The Customer Credit Subaccount has been an influential factor in the renewable energy market, as shown by the increase in the number of direct access customers purchasing renewable energy. The market showed steady growth until February 2000 when it began to plateau and then decline in June 2000. Effectively, all residential customers who were purchasing energy through the direct access market were purchasing renewable energy by February 2000.[51]

The evidence shows, however, that consumers' awareness that they are receiving the customer credit has been low.[52] The Energy Commission will investigate ways to better inform customers that they are receiving the customer credit as is discussed in more detail at the end of the section titled, "Eligibility for Funding." Providers have been successful in capturing the interest of consumers in purchasing renewable electricity but current market conditions make it impossible for most to continue serving their customers. The Commission will continue to support those customers who have chosen to purchase renewable energy and will be ready for the possibility that market conditions could become more favorable for renewable providers and consumers. Electric service providers are uniquely qualified to influence consumer choice, which complements the State's education efforts through the Consumer Education Fund.

The customer credit incentive can help make renewable energy more cost competitive with conventional generation technologies in the near-term, as well as build long-term demand for renewable energy. In the near-term, the customer credit can be used to offset the incremental cost of renewable energy. In the longer term, it can help build demand which can ultimately bring down the cost of renewables. Further, by building demand, the long-term viability of generators is expected to improve even as incentives decline over time. In the end, the market success of renewable energy will depend on demand for the product.

Description of Fund

The Customer Credit Fund will provide customers with a cents per kilowatt hour (kWh) rebate for the purchase of qualifying renewable energy. The incentive may vary over time depending upon market demand and the availability of funds. Funds are disbursed to electric service providers when they sell in-state renewable electricity to consumers. Consumers must be notified by their provider that they are purchasing renewable energy that qualifies for the customer credit, and the cents per kWh credit level that they are eligible to receive. Payments are calculated based on the number of eligible kWhs purchased from generators and sold to consumers multiplied by the credit level. Basing the credit payment on energy bought and served to customers means the provider receives more from the Fund as the amount of eligible energy sold to consumers increases.

In some cases, electric service providers may find it possible to utilize the customer credit and other incentives of the Renewable Energy Program to market a renewable product at a cost below that of conventional energy. Although there is typically a price premium for renewable

[51] The data on the number of customers receiving the Customer Credit as collected from Monthly Performance Reports submitted to the Energy Commission, compared with total direct access service requests as available from the California Public Utilities Commission.
[52] *Renewable Energy Program Preliminary Evaluation*, *Customer Credit Subaccount Evaluation*, Regional Economic Research, Inc., October 30, 2000.

energy, available incentives could more than offset that incremental cost and allow for a price discount on renewable energy. Such a pricing scenario is possible in part because the customer credit is not tied to the price of renewable energy, and in part because the market price of renewable energy can be disconnected from fossil fuel prices.

The Commission believes that there are solid market reasons for not tying the customer credit level to energy prices. Market activities such as educating customers about renewables and encouraging them to purchase renewable energy are not related to energy prices but rather are costs incurred by electric service providers seeking to market renewable energy. Also, a stable incentive level that does not fluctuate with energy prices may facilitate long-term power purchase agreements between providers and/or wholesalers and generators. Although renewable energy has historically been more expensive than conventional energy, there is no reason why electric service providers should not maximize incentives so as to offer consumers the best possible price for renewable energy.

Some parties have expressed concern that when the customer credit is eventually discontinued, the price for renewable electricity will rise and consumers will switch back to conventional energy. Although this scenario is a possibility, the Commission notes that an introductory low price is not an unusual market strategy and allows consumers to gain experience with a new product at minimum cost. Some customers may continue to purchase renewables if they receive a price discount, but others are likely to develop an interest in continuing to purchase renewable energy. Analysts cannot easily determine which customers have an entirely altruistic interest in renewables, and give the credit only to those customers. Instead, the Commission believes that the customer credit should be used as a tool for facilitating market development, with market forces ultimately determining the success of renewable energy.

Eligibility for Funding

Although the customer credit is a rebate for consumers who purchase renewable energy, payments from the Fund are actually made to electric service providers rather than consumers.[53] To receive funding from the Customer Credit Fund, providers must be registered with the Energy Commission as an eligible renewable provider. Electricity wholesalers (including power pools) that do not sell or broker energy to end-use customers may also register with the Energy Commission if their transactions include eligible renewable energy. Registered wholesalers, however, are not eligible to receive funding from the Fund.

To qualify for the customer credit, electricity must be produced by an "eligible renewable generation technology."[54] Beginning in 2003, eligible electricity must come from an eligible facility that is within its first five years of generation. Energy sold to investor-owned utilities under contracts entered into before 1996, however, is not eligible for customer credits. The attribute of the renewable energy that makes it eligible for the customer credit may be redeemed for customer credits separately from the commodity energy.

[53] This feature is intended to reduce state administrative costs, as making payments to individual consumers would be excessively costly to administer.

[54] As noted in Chapter 3 of this investment plan, the Commission is recommending that new renewable generation facilities located out-of-state but "landlocked" to the state's transmission grid be considered eligible.

Qualifying energy is only eligible for the customer credit if it is then sold to an eligible customer through a direct access transaction. Effective January 1, 2002, the RESIA states that public entities are not eligible to receive the customer credit, but legislation has been proposed to eliminate this exclusion (Assembly Bill 1724, Pavley). Regardless of the outcome of that bill, however, other consumers in the distribution service territories of utilities that collect the public goods surcharge from ratepayers and contribute it to the Renewable Resource Trust Fund are eligible to receive the customer credit.

As in the SB 90 program, funding to non-residential and non-small commercial customers is restricted to $1,000 per customer per year. Collectively, this class of customers may only receive $13.5 million (20 percent of the funds) over the five-year period covered by this investment plan. This provision is intended to offer an incentive for large customers interested in purchasing renewable energy while avoiding a rapid depletion of the Fund by a relatively small number of customers. The cap is also necessary because although many large customers have expressed a long-term interest in purchasing renewable energy, their electricity purchase decisions appear to be more cost driven than that of residential customers[55] and so care must be taken not to over-subsidize their purchases. Keeping the incentive payment for large customers small relative to their annual costs could help attract customers that are on the margin.

Providers are required to notify customers that they are receiving the customer credit. The notification needs to be standardized such that the information is prominently displayed to consumers on their bills, and through separate mailings if necessary (such may be the case for situations in which customers have electronic billing). This is necessary to increase consumers' awareness that they are purchasing renewable energy and receiving the customer credit.

Recommended Distribution Method

Funds will be distributed through a cents per kilowatt hour rebate paid monthly from the Customer Credit Fund to registered renewable providers. Payments will be made from the Fund after the provider reports that it has bought eligible renewable generation and has subsequently sold it to an eligible customer, consistent with the eligibility criteria outlined above. The credit level cannot exceed 1.5 cents per kWh and will be set for a six-month period. At the close of each six-month period the credit level will be re-set by the Energy Commission, as necessary, to reflect changes in market demand for renewable energy.

As in the SB 90 Program, payments will be calculated based on the month that energy was delivered to the eligible customer. The provider will have flexibility such that generation supplies claimed for customer credits do not have to match consumption on an hourly or monthly basis. Supplies generated in one month could be matched with consumer use from a different month, for example, but payments will be based on the credit level that was in place during the month the energy was consumed.

Payments will continue to be based on the minimum value of 1) the eligible renewable supplies purchased by the provider, and 2) the eligible load served to consumers who received the customer credit. Any imbalances between these two figures will be credited to the registered

[55] *Renewable Energy Program Preliminary Evaluation*, Regional Economic Research, Inc., October 30, 2000.

renewable provider and may be drawn upon in calculating payments in a following payment period.

Although the date of generation does not need to match the date of consumption, there needs to be a limit on how much time may elapse between the matching of consumption and generation. This limitation is necessary to stimulate ongoing demand for eligible generation and avoid misleading consumers who may expect that the renewable generation they purchase was recently generated. Consequently, when reporting supplies to the Energy Commission, the energy should be generated in the same calendar year as the load that was served, with some allowance made at the beginning of each calendar year as necessary.

Potential Changes in Fund over Time

Additional eligibility constraints on the Customer Credit Fund may be reasonable so as to provide the most cost-effective near-term benefits, while continuing to pursue the long-term goal of developing the infrastructure to support a fully competitive renewable industry. The Commission's decision to limit eligibility to electricity generated during the first 5 years from the date a power plant comes on-line (or the date it was substantially repowered) beginning in 2003 may be reconsidered if it proves to not have the desired result of fostering new renewable generation being purchased in the direct access market. The Energy Commission may also consider requiring providers dispersing the credit to send educational materials about renewable energy to their customers, or requiring providers to make their customer lists available so that the Energy Commission itself can send materials to these customers.

The Commission recommends that the amount of the customer credit not be adjusted for inflation over the five-year program period. The customer credit is intended to send consistent market signals by providing a fixed credit level over a set period of time. In addition, increasing the credit level is not consistent with program structure, since the credit level is not intended to be adjusted upward, but rather to be adjusted downward in response to increasing demand.

CHAPTER 7

CONSUMER EDUCATION

This chapter discusses the recommended allocation for consumer education activities, along with the rationale for that allocation, eligibility for funding, how funds will be distributed, and any potential changes to the fund over time.

Recommended Allocation

The Energy Commission recommends allocating five percent of the Reliable Electric Service Investments Act (RESIA) funding, or $33.75 million, without considering other contributions or inflation adjustments, to the Consumer Education Program to disseminate information on renewable energy and help develop a consumer market for renewable energy and small-scale emerging renewable energy technologies in California. The allocation of five percent represents a five-fold increase from the level of funding for consumer education activities under the Senate Bill (SB 90) program.

The Commission recommends increasing the allocation to this Fund based on several factors. First, stakeholders have indicated that the SB 90 allocation was insufficient to substantially increase consumer awareness about renewable energy options, especially in a state the size of California. In addition, an independent evaluation of the Renewable Energy Program[56] concluded that the one percent allocation to Consumer Education was not sufficient "to get the two messages of renewable energy and emerging renewable technologies out to residential consumers and commercial businesses." The evaluation recommends an allocation of $3 million to $7 million per year at a minimum to successfully implement a multi-faceted approach to developing a consumer market for renewable energy in California. The Commission believes that a five percent allocation to consumer education is appropriate given the size and scope of the job at hand and notes that this amount is significantly less than the funding allotted for other public entity consumer awareness campaigns.[57]

Table 7-1 shows the annual allocations recommended for the Consumer Education Fund, along with expected rollover from SB 90 funds.

Description of Fund

The three primary goals of the Renewable Energy Consumer Education Program are as follows:

1) Raise consumer awareness of renewable electricity generation options and their benefits,

[56] *Renewable Energy Program Preliminary Evaluation*, Regional Economic Research, Inc., October 30, 2000.
[57] For example, the "Flex Your Power" campaign currently being conducted by the California Department of Consumer Affairs is allotted $20 million.

2) Increase the purchases of both renewable energy from the grid and small-scale emerging renewable technologies, and

3) Leverage strategic alliances and partnerships with organizations connected to renewable energy in California.

Table 7-1
Consumer Education Fund By Year

	2002	2003	2004	2005	2006	Overall[58]
Allocation	5% $6.75 Million	5% $6.75 Million	5% $6.75 Million	5% $6.75 Million	5% $6.75 Million	5% $33.75 Million
Estimated Rollover:[59] $0						

A wide range of consumer education activities have been implemented under the SB 90 program in support of these goals. Under the direction of the Energy Commission, the Renewable Energy Marketing Board (REMB) and their coalition partners conducted grass roots and media activities in targeted communities throughout the State. Market research was conducted to better understand the market for emerging renewable energy technologies. Two grant solicitations were conducted and grants were awarded to various entities and organizations to support consumer education and outreach activities for the renewable energy market. Additionally, the Energy Commission is letting a contract with a marketing/public relations firm to conduct a statewide Renewable Energy Public Awareness Campaign.

In addition to the continued work in these types of consumer education activities, the Commission recommends that education activities address market barriers affecting emerging technologies. These activities may include training, education and outreach for local building department personnel and inspectors, building contractors, installers and engineers to lower the costs, reduce delays and improve the installation quality of emerging renewable energy systems.

The SB 90 program allocated 80 percent of the consumer education funds to support the renewable energy market and 20 percent of the funds to focus on the emerging renewable technologies market with different program administrators for each. This allocation was based on estimations of relative costs of campaign products and activities. A non-profit entity provided consumer education program administration for the initial phase of the renewable energy campaign with the Energy Commission staff administering the remaining program activities.

The Commission agrees with the recommendation made by stakeholders that a single entity should provide program administration for both the renewable energy and emerging renewable technology markets and that, when possible, a single or blended message be developed and disseminated. To maximize flexibility, the staff will administer a single, comprehensive program

[58] The dollar amounts do not include other contributions or inflation adjustments.
[59] The rollover estimate is based on the total allocation to the Consumer Education Subaccount from the beginning of the SB 90 Renewable Energy Program less expected encumbrances by January 2002.

that integrates a common message with targeted and specific strategies for each market and target audience.

Eligibility for Funding

To be eligible for funding from the Consumer Education Program, participants must be one of the following:

1) A nonprofit entity whose mission or expertise is consistent with the goals and purpose of the Consumer Education Program,

2) An individual or company with marketing, public relations, consumer education or public-interest marketing experience, or

3) A public agency with pertinent experience or expertise.

Participants must also comply with the administrative requirements and criteria contained in Energy Commission solicitations through which funding will be distributed.

Projects and programs eligible for funding are required to provide information to consumers about renewable electricity products and emerging renewable generation technologies. Information developed and funded by the Consumer Education Program must be factual and broad-based. Information and messages must be general in nature and not specific to any product, manufacturer or provider.[60] All projects and programs must be inclusive in opportunity. Information on the project or program must be provided in a timely manner so that all interested market participants have an opportunity to coordinate or participate in the project or program.

Recommended Distribution Method

Funds from the Consumer Education Program will be distributed through grants and contracts. Individuals and entities interested in receiving funding must submit an application or proposal in response to a solicitation document issued by the Commission. The solicitation document will specify the amount of funding available, the funding limit on a project or program, the administrative requirements for submitting an application or proposal, the criteria that will be used to evaluate the application or proposal, and the solicitation schedule. The solicitation document will also include a sample funding award agreement identifying the terms and conditions applicable to the award.

Potential Changes in Fund Over Time

Given the distribution mechanism for this Fund, the Commission believes there is no need to adjust expenditures for inflation over time.

[60] Promotions may be technology-specific in the case of activities aimed at emerging technology markets.

CHAPTER 8

FUEL CELLS

This chapter discusses the potential allocation of funding to fuel cell technologies that meet specific criteria contained in the Reliable Electric Service Investments Act (RESIA).

The RESIA directs the Energy Commission to recommend an allocation to "specified fuel cell technologies, if the Commission makes all of the following findings:

A) The specified technologies have similar or better air pollutant characteristics than renewable technologies in the investment plan.

B) The specified technologies require financial assistance to become commercially viable in reference to wholesale generation prices.

C) The specified technologies could contribute significantly to the infrastructure development or other innovation required to meet the long-term objective of a self-sustaining, competitive supply of renewable energy."[61]

Because renewable fuel cells are properly included as "emerging renewable technologies"[62] under the RESIA, the term "specified fuel cell technologies" is assumed to refer to other fuel cell technologies, including fuel cells that use fossil fuels such as propane, methanol, or natural gas. Since the predominant fuel today for fuel cells is natural gas, we will use the term "natural gas fuel cell" to refer to the "specified fuel cell technologies." Grid-connected renewable fuel cells are already eligible to receive funding from the Emerging Renewable Resources Account of the Senate Bill 90 (SB 90) Renewable Energy Program (REP) in the form of capital-cost buydowns to purchasers. [63]

The Commission finds that:

- Natural gas fuel cells in cogeneration applications have similar criteria air pollutant characteristics as the renewable technologies in the investment plan, while non-cogeneration applications have higher emissions of global warming potential gases.

- Natural gas fuel cells are not currently commercially viable by reference to wholesale generation prices, and therefore require public funding assistance. However, financial assistance is expected to be available to these fuel cells through two separate programs – the California Public Utilities Commission's (CPUC) Self-Generation Program under Assembly

[61] §399.6, subd. (c)(7).
[62] §399.6, subd. (c)(2).
[63] Since the beginning of the program in 1998, only one fuel cell system has been installed and received funds from the REP.

Bill 970[64] and the Energy Commission's Solar Energy and Distributed Generation Grant Program under Senate Bill 1345.[65] The Commission believes that when the CPUC funds become available, they should be the first source of funding for non-renewable fuel cell technologies. Consequently, though non-renewable fuel cell technologies in cogeneration applications are eligible for funding, the Commission allocates no further assistance to these technologies from RESIA funds at this time. The Commission will monitor these other programs to determine whether the support provided to specified technologies is sufficient and, if not, will recommend funding for these technologies in the future.

- Natural gas fuel cells have the potential to contribute to long-term renewable infrastructure development in several ways. Most directly, development of natural gas fuel cells would tend to bring down the costs of renewable fuel cells, since the technology is the same. Other, more indirect, potential contributions are either well in the future or are likely to be accomplished by other technologies.

Background

Fuel cells combine hydrogen-bearing fuel with air-borne oxygen in an electrochemical reaction to produce electricity, water, and heat. Currently, fuel cells can use natural gas or other fossil fuels, but the fuels have to be pre-processed into a usable form. Fuel cells can also use hydrogen obtained by electrolysis of water using electricity from photovoltaics or wind energy.

Fuel cell applications that were evaluated are those for distributed generation (200 kilowatts [kW] to 30 megawatts [MW]) and centralized generation (>100 MW). Natural gas is currently the predominant fuel for these applications, although propane and methanol are also used.

The Emerging Renewable Resources Account of the Senate Bill 90 (SB 90) Renewable Energy Program (REP) provided capital-cost buydowns to purchasers of grid-connected fuel cells that utilize a renewable fuel. Since the beginning of the program in 1998, only one completed fuel system that has received funds from the Emerging Account has been installed.

As shown in Table 8-1, there are four major types of fuel cells (classified according to electrolyte) at different stages of development and with different potential applications – phosphoric acid (PAFC), proton exchange membrane (PEMFC), molten carbonate (MCFC), and solid oxide (SOFC). Phosphoric acid fuel cells (PAFC) have been commercially available since 1990 with an installed base of approximately 200 units.[66] Other fuel cell technologies – SOFC, MOFC and PEMFC – are still under development and are not commercially available.

Stationary applications for fuel cells include both distributed power generation (0.2 to 30 MW) and centralized power generation (>100 MW). In distributed generation, fuel cells offer considerable benefits where power availability and quality is important and/or combined heat and power (CHP) applications are possible. In addition, there is a great deal of interest in

[64] Stat. 2000, Ch. 329, as codified in Public Utilities Code §399.15(b).
[65] Stat. 2000, Ch. 537, as codified in Public Resources Code §25619 and 25620.10.
[66] The PAFC is manufactured by International Fuel Cells – a division of United Technologies. The PC25 is a 200kW power module operating on low-pressure gas.

developing fuel cells for automotive applications, offering the promise for significant air pollution reductions.

Table 8-1
Fuel Cell Characteristics and Commercialization Status

	PAFC	PEM	MCFC	SOFC
Electrolyte	Orthophos-phoric acid	Sulfonic acid in polymer	Mixture of lithium and potassium carbonates	Yttrium stabilized zirconia
Operating Temperature	180-210 ^{o}C	80-100 ^{o}C	600-700 ^{o}C	650-1,000 ^{o}C
Fuel	Natural gas Hydrogen	Natural gas Hydrogen Methanol	Natural gas Synthetic gas	Natural gas Synthetic gas
Electric Conversion Efficiency (w/Cogen-eration)	40% (60 – 80%)	30 - 40%	43 - 44%	50 - 60% (90 - 95%)
Manufacturers/ Developers	International Fuel Cells	Avista Labs, Ballard Power Systems, Dais, Energy Partners, H-Power, International Fuel Cells, Mosaic Energy, Northwest Power Systems, Plug Power, others	Fuel Cell Energy	Materials and Systems Research, Honeywell, Siemens-Westinghouse, Global Thermoelectric, Ceramic Fuel Cells, others
Applications	Stationary power	Stationary power Transportation	Stationary power	Stationary power
Outlook	Introduced in early 1990s; fuel cell pioneer focused on niche and specialty markets due to high $/kW cost	Getting the most attention due to its potential in vehicles, portable power and small stationary power (≤250kW). Initial commercialization 2001-2002.	Niche product focused on commercial, industrial, institutional and specialty power markets. Initial commercial-ization 2001-2003.	Potential long-term player in stationary power due to high efficiency and simplified balance of plant, leading to low manufacturing cost per kW. Initial commercialization 2002-2004. (Tubular and planar designs being developed.)

Source: Gas Technology Institute

Air Pollutant Characteristics

In general, emissions of air pollutants are directly related to the use of fossil fuels and /or combustion. Table 8-2 shows how these two general factors apply to natural gas fuels cells and for the renewable technologies contained in the investment plan. As can be seen, many

renewable technologies are not affected by either fossil fuels (to any appreciable measure) or by combustion. Others engage in combustion of renewable, not fossil fuels, which means that the fuels use would generally have either been burned anyway, or decayed, releasing methane gas, in contrast to fossil fuels which are sequestered underground and contribute to air pollution only when extracted and burned or released. Renewable technologies are allowed under California law to use up to 25 percent fossil fuels and still be considered renewable; currently, only the solar thermal plants in California approach this percent of fossil use on a regular basis.

Table 8-2
Emission-Related Factors

Technology	Fossil Fuel Use	Combustion
Natural gas fuel cells	X	
Solar thermal electric	25%	25%
Biomass – anaerobic digestion		X
Biomass – direct combustion		X
Landfill gas		X
Municipal solid waste		X
Geothermal		
Photovoltaic		
Small hydro		
Wind		

The United States Environmental Protection Agency classifies six air pollutants as "criteria pollutants." These pollutants are nitrogen oxides (NOx), sulfur oxides (SOx), carbon monoxide (CO), particulates (PM or PM_{10}), lead, and ozone (VOC/ROG). Many of these pollutants result from combustion related processes. Other air pollutants or emissions that are of concern include toxic chemicals, which most often come from non-combustion related industrial processes, and carbon dioxide (CO_2), which is a contributor to the Global Climate Change problem.

Fuel cells rely on electrochemical reactions rather than combustion to convert fuel to electricity and possibly recoverable heat. Absence of combustion results in natural gas fuel cell emissions being much lower than those associated with fossil-fueled technologies that involve combustion.[67] While there is some variability across the several fuel cell types, in all cases emission rates are low. Available air pollutant emission data for fuel cells utilizing natural gas are summarized in Table 8-3. The zero values in Table 8-3 reflect the fact that it is not uncommon for several air pollutants regulated by California air pollution laws – SOx, CO, VOC, and PM10 – to be present in undetectable quantities.

[67] Staff Report on: Air Pollution Emissions: Trends and Restructuring Implications, Joseph M. Loyer, Environmental Protection Office, Energy Facilities Siting and Environmental Protection Division, California Energy Commission, June 18, 1996.

Table 8-3
Fuel Cell Emissions (lb / MWh)

	NOx	SOx	CO	VOC/ROG	PM10
Fuel Cell Emissions	4.0E-4 to 5.2E-2	0 to 3.8E-3	0 to 9.5E-2	0 to 3.6E-4	0 to 1.7E-2
SCAQMD Limits	≤ 3	≤ 150	≤ 10	N/A	N/A

"N/A" ≡ Not Available

Because natural gas fuel cell air emissions rates are low and predictable, several air quality management districts in California have exempted them from air quality regulations related to power plant siting. For example, the South Coast Air Quality Management District (SCAQMD) granted a blanket exemption from all air permitting in the Los Angeles Basin Area. As can be seen in Table 8-3, are generally significantly lower than SCAQMD limits..

In addition, fuel cell emissions are directly related to total power plant efficiency, which is governed by technology type and system configuration. In cases where heat released during fuel cell operation is captured and used, avoided emissions benefits may be realized. Had the heat not been recovered, it would have had to have been provided by other means. In many cases a hot water or steam boiler would have been used to provide the heat. The combined heat and power (CHP) capabilities of natural gas fuel cells can have a significant impact on their overall air pollutant characteristics.

Natural gas fuel cells will release approximately 1075 lb CO_2 per MWh. Carbon dioxide releases per unit of electricity generated will be smaller than those from less-efficient fossil fuel generation technologies, and much smaller when CHP configurations are employed. For example, a well-designed CHP/fuel cell configuration can reduce average emission rates of CO_2 from 1075 to 660 lb/MWh.[68]

Operation of the wind, hydro, and photovoltaic technologies results in no direct release of carbon dioxide or other pollutants into the atmosphere. Geothermal power plants also release minimal air pollutants. Those involving steam may release CO_2 at a rate of approximately 122 lb/MWh, much smaller than any natural gas fuel cell configuration. Solar thermal electric with supplementary natural gas combustion has higher combustion related emissions than natural gas fuel cells, but since fossil fuel use is limited to 25 percent of the energy input, the carbon dioxide emissions are lower at approximately 490 pounds per MWh. Combustion of biomass, MSW, and landfill gas results in air emissions that are offset to varying amounts by the alternative fates of these fuels. In general, however, these technologies can be thought of emitting small amounts of air pollutants, because the fuels being combusted would be otherwise combusted or released to the atmosphere. For the same reason, combustion of biomass, landfill gas, and MSW emits negligible quantities of CO_2.

[68] NYSERDA 1997, cited in Greene and Hammerschlag, "Small and Clean is Beautiful: Exploring the Emissions from Distributed Generation and Pollution Prevention Policies", June 2000 Electricity Journal

In conclusion, natural gas fuel cells have similar and in some cases lower air pollutant emissions to the majority of the investment plan technologies, with the exception of the emission of CO_2. Here, it seems clear that unless natural gas fuel cells are installed in combined heat and power (CHP) systems, they will emit significantly more CO_2 than the renewable technologies. Even in CHP installations, the CO_2 emissions of natural gas fuel cells are above those of the majority of renewable technologies. It is therefore reasonable to conclude that natural gas fuel cells in combined heat and power applications have similar criteria air pollutant characteristics as the renewable technologies in the investment plan.

Need for Financial Assistance

Fuel cells are currently garnering the attention of both the private and public sectors. Public sector programs are contributing to the development of fuel cell technology, as are funds provided by private investors. However, the question of the "need for financial assistance" is understood to refer to public sector financial support. This need is measured in terms of expected wholesale prices, factoring in other sources of public sector financial support.

Wholesale generation prices are prices agreed to by sellers and buyers in the wholesale electricity markets. As we have seen in California in particular this year, wholesale prices are a complex function of dynamic and variable factors. Wholesale generation prices are affected by changes in such things as daily varying and weather sensitive loads, generation technology mix, fuel costs, reserve margin, and Federal and State regulation. While generator and fuel costs establish physical bases for wholesale generation prices, demand and market forces are also critical determinants of prices. Wholesale prices are high today in California, and may be for some time due to higher natural gas costs and other factors, but the predominant technology being considered for increasing system capacity is a natural gas fired power plant. For this reason, it is reasonable to consider the wholesale cost of a new, natural gas-fired combined cycle plant as a long-term metric for wholesale prices. To this end, the Commission compared the cost of a new natural gas fired combined cycle facility with the cost of a 200 kW phosphoric acid fuel cell (PAFC), used because this technology has a performance track record.

The cost of a 200 kW PAFC is approximately $4,000 per kilowatt (kW), while the current cost of a natural gas-fired combined cycle power plant is $500 per kW. While the cost of energy generated at these new natural gas plants is estimated at 2.8 cents per kWh (using natural gas fuel prices of $3.50 per MMBtu), the cost of generating electricity using fuel cells is 8.7 cents per kWh, roughly three times the cost of natural gas plants. With higher natural gas costs, both conventional power and fuel cell costs would change. If a natural gas fuel cell system is configured for combined heat and power (cogeneration), the value of recovered heat is approximately 1.4 cents per kWh. This benefit offsets one quarter of the difference between wholesale generation prices and the cost of electricity from the PAFC. This difference in costs should remain consistent at the higher natural gas costs we experience today.

Other fuel cell technologies, as noted above, are less advanced on the development curve. If commercial viability is to be achieved, it is likely that financial assistance will be required to help create a market that is sufficiently large to deliver self-reinforcing economies of production. Without assistance, the near-term niche market is likely to where power quality and power

reliability are extremely important, and the development of this market might result in cost reductions. Over the next ten years, the global market for reliable power and quality power natural gas fuel cell applications has been projected to be approximately 1900 MW per year.

Continued development and full commercialization of these technologies will not occur without additional investment. While it is theoretically possible that natural gas fuel cells could make the leap from development to commercial viability by reference to wholesale generation prices without receiving additional public sector financial support, this additional support would likely accelerate this important step.

The Commission therefore concludes that non-cogeneration natural gas fuel cells are not currently viable in reference to wholesale generation prices without public sector assistance in most applications. Fuel cells installed in combined heat and power applications may be viable, and the applications have better efficiency of gas use and better emissions characteristics. In either case, the Commission concludes that public sector financial assistance is necessary.

At this time, two programs explicitly provide or are expected to provide such public assistance in California. The California Public Utility Commission has recently adopted a program under Assembly Bill 970 designed to support self-generation technologies. This program provides rebates of $2.50 per watt or 40 percent of system costs for non-renewable fuel cells up to 1 MW. In addition, the Energy Commission's Solar Energy and Distributed Generation Grant Program under Senate Bill 1345 provides grants of either $2,000 or 10 percent of system cost, whichever is less, to support the purchase of small distributed generation systems. Given that these two programs will or are expected to provide support to natural gas fuel cells, the Commission believes that fuel cells that use natural gas or other non-renewable fuel do not need further assistance from the RESIA funds at this time. The Commission will monitor these and other programs to determine whether the support provided to the specified technologies is sufficient.

Fuel Cells and the Development of Renewable Resources

There are a variety of ways in which natural gas fuel cells can contribute to developing fuel cell technology and markets to help meet the long-term objective of a self-sustaining, competitive supply of renewable energy. Three fundamental ways are: a) by fostering the development of fuel cell technology for renewably-fueled fuel cells; b) by serving effectively as a storage technology, storing energy generated by photovoltaics or wind as hydrogen, then used in a fuel cell; and c) by serving to advance distributed generation protocols and feasibility.

The Commission believes that natural gas fuel cell development would tend to lower costs for renewably fueled fuel cells, thereby assisting their development. Increased production volumes can result in lower per-unit costs, beneficial purchasing arrangements with suppliers, increased assembly productivity, innovations in the manufacturing process, improvements in design, and better availability of research and development resources.

While renewable fuel cell systems may require minor fuel cell design modifications and different fuel processing, there is still a great deal of similarity between natural gas and renewable fuel

cell systems (e.g., fuel cell stacks are very similar). Advances in natural gas fuel cell technology will easily carry over to fuel cells using renewable fuels.

Some renewable energy resources, wind in particular, are intermittent in nature. A viable storage or energy conversion technology can be used to take the energy generated from wind and convert it to a form that can be stored for use when needed. In the long run, fuel cells may play an important role in renewable energy supply because they can efficiently and cleanly convert into electricity and heat renewable energy that has been stored in the form of chemical potential energy. The ability to store this energy and control the timing of its utilization is important. Today, fuel cells are more likely to utilize hydrogen that is separated from a hydrocarbon. Since fuel cells operate using hydrogen, it is possible that fuel cells could extend this usage flexibility to intermittent renewable resources by having the energy generated converted to hydrogen that can be used when needed in a fuel cell.

Desirable fuel cell air pollutant emissions characteristics are responsible for their having already been selected for several landfill gas and wastewater treatment plant projects. In the future, fuel cells may utilize hydrogen produced by electrolysis with electricity from photovoltaics or wind energy.

Finally, experience gained with fuel cells, whether natural gas or renewable, can contribute to resolving issues and establishing protocols that currently hinder larger scale use of distributed generation technologies. Some of these issues include safety, transmission and distribution system stability and dispatch, and requirements and prices for backup or standby power.

DEFINITIONS

Avoided cost — the price paid to non-utility power producers equal to the costs utilities avoid by not having to generate or purchase power themselves. Avoided costs may be paid for energy or capacity.

Biomass — any organic material not derived from fossil fuels.

Broker — an entity arranging the sale and purchase of electric energy, transmission, and other services between buyers and sellers, but does not take title to any of the power sold (Public Resources Code section 331(b)).

California in-state electrical corporations — Pacific Gas and Electric Company, San Diego Gas and Electric Company, Southern California Edison Company, or other electrical corporations as defined by Public Utilities Code Section 218, contributing funds to the Renewable Resource Trust Fund.

Capacity — the maximum amount of electricity that a generating unit, power facility, or utility can produce under specified conditions. Capacity is measured in kilowatts or megawatts.

Capacity payments — payments to electricity generators for their electric generating capacity, currently based on the costs of installing a low-cost generation type (i.e. combustion turbine) that a utility would add strictly for reliability.

Cogeneration — production of heat energy and electrical or mechanical power from the same fuel in the same facility. A typical cogeneration facility produces electricity and steam for industrial process use.

Commercially available — for purposes of the Emerging Renewable Resources Account, the condition that exists when complete generating systems are available for immediate purchase under typical business terms and are deliverable within a reasonable period of time.

Competitive transition charge (CTC) — a charge authorized by the California Public Utilities Commission that is imposed on investor-owned utility (IOU) ratepayers (i.e. customers that receive electricity distribution services from the IOU) to recover the costs of utility investments made on behalf of ratepayers. The CTC is to be collected in a competitively-neutral manner that does not increase rates for any customer class solely due to the existence of transition costs. [Public Utilities Code Section 367]

Conventional energy — energy produced from a "conventional power source," as defined in Public Utilities Code Section 2805, which includes power derived from nuclear energy, or the operation of a hydropower facility greater than 30 megawatts, or the combustion of fossil fuels with the exception of cogeneration.

Customer credit — the credit provided to an end-use consumer of renewable electricity under the Customer Credit Subaccount. The credit is shown on the end-use consumer's utility bill.

Digester gas — gas from the anaerobic digestion of organic wastes.

Direct-access market — a new market in California's electricity industry, whereby residential, commercial, agricultural, and industrial electricity customers can purchase electricity directly from non-utility providers instead of the customer's utility.

Distributed generation — small scale electricity generation facilities sited in or close to a load center or at a customers' site.

Electric service provider — an entity such as a marketer or aggregator who provides electricity directly to an end-use customer in the direct-access market.

Electrical corporation — see Section 218 of the Public Utilities Code

Emerging renewable generation technologies — photovoltaic, solar thermal electric, fuel cell using a renewable fuel, small wind turbine (not more than 50 kilowatts), and other technologies specifically identified by the Energy Commission as meeting the criteria necessary to be considered emerging under this investment plan.

End-use customer — a residential, commercial, agricultural, or industrial electric customer who buys electric power to be consumed as a final product (not for resale).

Facility — see ***project.***

Fixed energy payments — payments to a generator for energy delivered under a power purchase contract, which are based on a price per unit measure of electricity that was known or ascertainable at the time the contract was entered into. (Fixed energy payments cannot be based on market conditions, such as short-run avoided costs, since these conditions were not known or ascertainable at the time the power purchase contract was entered into).

Fossil fuel — fuel comprised of hydrocarbon constituents, including coal, petroleum, or natural gas, occurring in and extracted from underground deposits, and mixtures or byproducts of these hydrocarbon constituents.

Fuel cell — an advanced energy conversion device that combines hydrogen-bearing fuels with air-borne oxygen in an electrochemical reaction to produce electricity very efficiently and with minimal environmental impact.

Full-scale — of a scale or size equal or comparable to the scale at which commercially available generating systems are being sold or are expected to be sold.

Geothermal — natural heat from within the earth, captured for production of electric power, space heating, or industrial steam.

Gigawatt-hour (GWh) — one million kilowatt-hours (a typical California household consumes about 500 kWh in an average month).

Grid — the electrical transmission and distribution system linking power plants to customers through high power transmission line service.

Grid connected — The condition whereby a generating system serves and is electrically connected to electrical load(s) that are also connected to and served by the electrical transmission grid.

Hydroelectric — a technology that produces electricity from falling water that turns a turbine generator, referred to as hydro. See also "small hydro."

Installed capacity — see ***nameplate capacity***.

In-state renewable generation — biomass, solar thermal, photovoltaic, wind, geothermal, small hydropower of 30 megawatts or less, waste tire, digester gas, landfill gas, and municipal solid waste generation technologies, as described in the Energy Commission's *Policy Report on AB 1890 Renewables Funding*, including any additions or enhancements thereto, that are produced in facilities located in this State and placed in operation after September 26, 1996, or that were operational before that date, and that are also certified under Section 292.207 of Title 18 of the Code of Federal Regulations as a qualifying small power production facility either located in California, or that began selling electricity to a California electrical corporation before September 26, 1996, under a Standard Offer Power Purchase Agreement authorized by the California Public Utilities Commission.

Investor-owned utility (IOU) — a utility that is organized as a tax-paying business, whose properties are managed by representatives elected by shareholders.

Kilowatt (kW) — one thousand watts. A unit of measure for the amount of electricity needed to operate given equipment. A typical home using central air conditioning and other equipment might have a demand of 4-6 kW on a hot summer afternoon.

Kilowatt hour (kWh) — the most commonly-used unit of measure describing the amount of electricity consumed over time. It means one kilowatt of electricity supplied for one hour. A typical California household consumes about 500 kWh in an average month.

Landfill gas (LFG) — gas produced by the breakdown of organic matter in a landfill (composed primarily of methane and carbon dioxide) or the technology that uses this gas to produce power.

"Landlocked" out-of-state facility — a facility that is partially or wholly located outside of California, but is interconnected solely to California's electric transmission grid and has no possible interconnection outside California.

Load – the amount of electric power supplied to meet one or more end user's needs.

Local publicly owned electric utility — as defined in Public Utilities Code section 9604, subdivision (d), and which includes a municipal utility district, a public utility district, an irrigation district, or a joint powers authority made up of one or more of these entities.

Marketer — an agent for generation projects who markets power on behalf of the generator. The marketer may also arrange transmission, firming or other ancillary services as needed. Though a marketer may perform many of the same functions as a broker, the difference is that a marketer represents the generator while a broker acts as a middleman.

Megawatt (MW) — one thousand kilowatts. One megawatt is about the amount of power to meet the peak demand of a large hotel.

Metered — The independent measurement with a standard meter of the electricity generated by a project or facility.

Municipal solid waste (MSW) — garbage that does not consist primarily of products manufactured from fossil fuels, which can be processed and burned to produce energy.

Municipal utility — a local publicly owned (customer-owned) electric utility that owns or operates electric facilities subject to the jurisdiction of a municipality, as opposed to the California Public Utilities Commission.

Nameplate capacity — the maximum amount of electricity that a generating unit, power plant or utility can produce under specified conditions, measured in kilowatts or megawatts.

Non-bypassable system benefit charge — a surcharge applied to the electric bills of IOU ratepayers that customers cannot avoid for any reason (e.g., by changing electric service providers).

On-site generation — any electricity that is generated and used to serve load on the site of generation.

PG&E — Pacific Gas & Electric Company

Photovoltaic (PV) — a technology using a semiconductor that converts light directly into electricity.

Power Exchange (PX) — an independent, nonprofit entity created pursuant to AB 1890 that is responsible for conducting an auction for the generators seeking to sell energy and for loads which are not otherwise being served by bilateral contracts. The Power Exchange was responsible for scheduling generation, determining hourly market clearing prices for its market, and settling and billing for suppliers and retailers using its market, but ceased operation in spring of 2001 because of complications arising from California's energy crisis.

Power pool — an entity into which many generators may offer to sell their power and out of which many electric service providers or wholesalers may offer to purchase power, such that the buyer and seller need have no knowledge of each others' identity (because the buyer is buying "pooled" power and not power from a specific generator), such that at least some portion of the power sold into the pool is "eligible renewable" as defined in Public Utilities Code section 398.4(h)(1)(F) and also such that the amount of power sold into the pool equals the amount of power purchased from the pool over the calendar year.

Price cliff — the end of the fixed energy price portion of a Standard Offer 4 contract between an electricity generator and an investor-owned utility, after which the generator receives energy payments based on the short-run avoided cost, which is typically much lower than the contract price (usually occurs in year 11 of the contract).

Project — For the purposes of the New Renewable Resources Account, a group of one or more pieces of generating equipment, and ancillary equipment necessary to attach to the transmission grid, that is unequivocally separable from any other generating equipment or components. Two or more sets of generating equipment that are contiguous, or that share common control or maintenance facilities and schedules and are located within a one mile radius shall constitute a single project. For the purposes of the Emerging Renewable Resources Account, all otherwise eligible generating systems installed during the term of this program at one physical site and serving the electrical needs of all real and personal property located at this site, where a site is a single parcel of real property plus any improvements.

Provider — an entity that is either a supplier, marketer, or aggregator, or some combination, that provides electricity to end-use customers.

Public goods surcharge — a surcharge applied to the electric bills of IOU ratepayers used to support energy efficiency, research, development an demonstration (RD&D), low income, and renewables programs. Also called *systems benefit charge*.

Public Utility Regulatory Policies Act (PURPA) — Federal legislation passed in 1978 implemented by the Federal Energy Regulatory Commission and the California Public Utilities Commission (CPUC). Under PURPA each electric utility is required to offer to purchase available electric energy from cogeneration and small power production facilities at the utilities' avoided cost.

Qualifying facility — a qualifying small power production facility eligible for certification pursuant to Section 292.207 of Title 18 of the Code of Federal Regulations.

Renewable — a power source other than a conventional power source within the meaning of Section 2805 of the Public Utilities Code, provided that a power source utilizing more than 25 percent fossil fuel may not be included. Section 2805 states: " 'Conventional power source' means power derived from nuclear energy or the operation of a hydropower facility greater than 30 megawatts or the combustion of fossil fuels, unless cogeneration technology, as defined in Section 25134 of the Public Resources Code, is employed in the production of such power."

Repower(ed) — generically refers to replacing a significant portion of the generating equipment at an existing facility.

SCE — Southern California Edison Company

SDG&E — San Diego Gas & Electric Company

Self-generation — generation of electricity used primarily for service on-site electric load.

Small hydro — a facility employing one or more hydroelectric turbine generators, the sum capacity of which does not exceed 30 megawatts. For purposes of this definition, "facility" shall be defined in a manner consistent with Title 18 of the Code of Federal Regulations, sections 292.201 et seq., provided however that the size of the facility is limited to 30 megawatts, rather than 80 megawatts.

Solar thermal electric — the conversion of sunlight to heat and its concentration and use to power a generator to produce electricity.

Solid-fuel biomass — a biomass technology that utilizes solid fuel, such wood, agricultural waste, and other organic material that may be burned to produce electricity.

Standard offer contracts — standard contracts authorized by the California Public Utilities Commission for a utility's purchase of electric power from a qualifying facility. There were four such contracts: SO1, which pay for as-delivered capacity, with short-run energy payments; SO2, which pay for firm capacity, with short-run energy payments; SO3, which are essentially the same as SO1 contracts but are for facilities with capacity under 100 kW; and ISO4, which pay for firm capacity for up to 30 years, and pay fixed energy payments for the first 10 years of the contract with payments reverting to variable payments in the 11^{th} year.

Tier — technology-specific division within the Existing Renewable Resources Account

Western Systems Coordinating Council (WSCC) — One of the ten regional reliability councils that make up the North American Electric Reliability Council.

Wholesaler — an entity which buys and sells electricity to providers, or one who acts as a broker in negotiating sales of power to providers.